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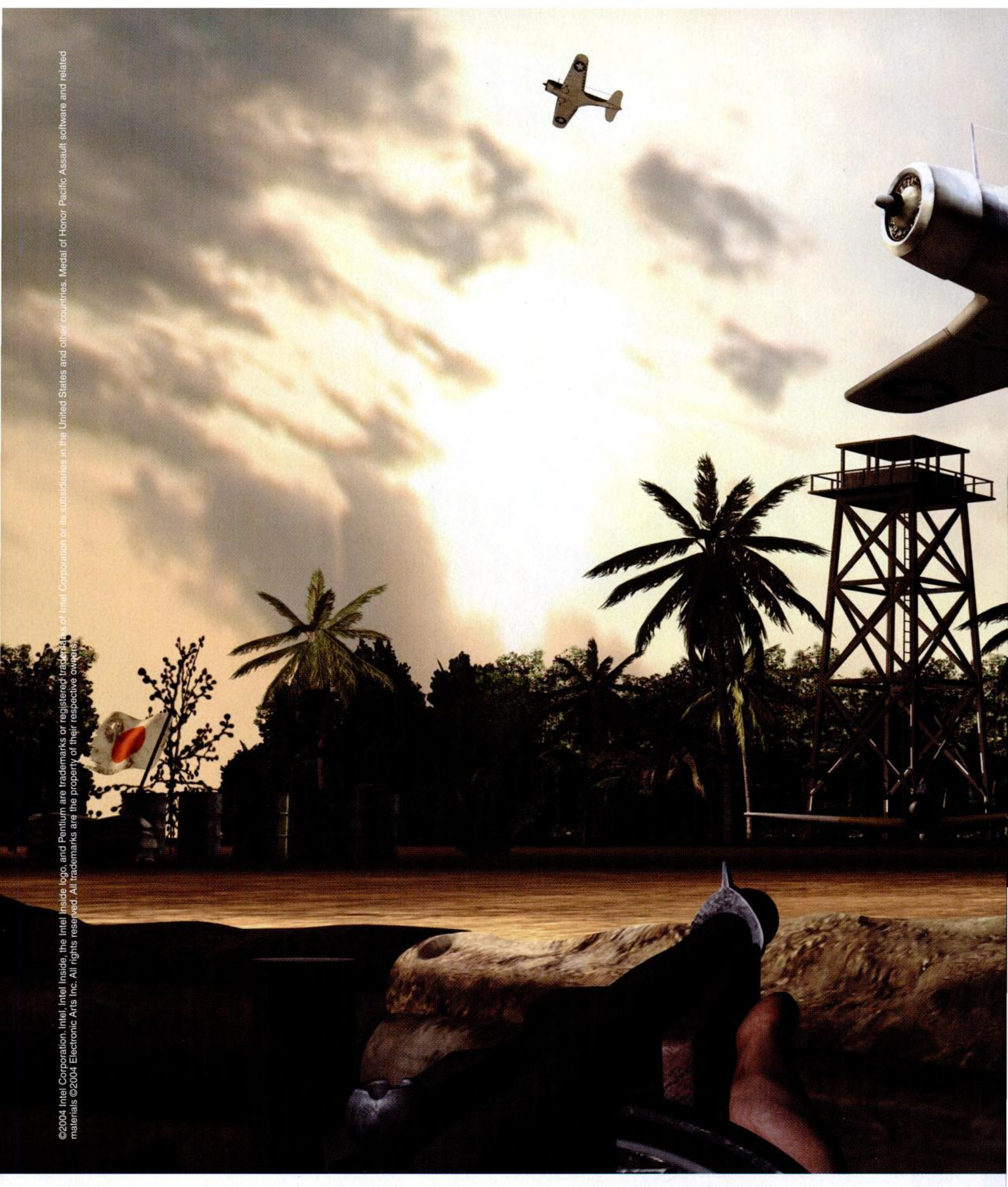

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Release Notes

The Lab At Its Best

I just built a *Doom 3* gaming PC with two 36GB Western Digital Raptor drives set up in a RAID 0 array. Seven days ago, I would have sworn up and down that because of RAID, the level load times for id Software's latest version of *Doom* were significantly faster than they were on a single-drive system of similar configuration. In fact, when I entered the very first level in the game, I found myself thinking, *Man, it's amazing how big a difference a RAID array makes.*

It turns out that I, like many, many other gamers and PC manufacturers, was wrong. Level load times in *Doom 3*—along with scores of other modern PC games—are no faster with RAID than with a single drive. In fact, in some cases, level load times are actually slower with RAID than with a single drive!

The way we discovered this shocking revelation is a shining example of the rapidity with which information travels and cultivates change in modern times. It's also an industry-wide testament to the scientific method *Maximum PC* has espoused since its inception.

We ship *Maximum PC* to the printer in sections; each day we submit a new chunk of pages to our production department, and from there it goes on to the printer. On the second day of shipping pages, Associate Editor Josh Norem literally stumbled upon an Internet story on a hardware site that detailed a finding in direct contrast to our long-held belief that RAID 0 provides faster read times, and therefore faster level loading times. If you're a hardcore PC user, it's quite likely you hold this belief yourself.

Norem and Senior Editor Gordon Mah Ung immediately set out to verify the results in a frenetic three-day period of testing, speculation, and bickering. Adhering to the principles of scientific method, which dictates thorough and repeated experimentation until one has validated or proved wrong the hypothesis—in this case, that RAID 0 is no faster than a single drive—the editors tested multiple system configurations with a slew of different games. The results of their testing supported the reports we originally read online. (For explicit details, turn to In the Lab on page 72.)

Here's where it gets interesting: as this finding receives more attention, it could have industry-wide ramifications, at least in terms of PC building for gaming performance. For example, all six high-end PCs in this month's high-performance gaming PC round-up use RAID 0. And while it's important to note that RAID 0 still delivers performance boosts in certain non-gaming circumstances, this could force a major rethinking of RAID philosophies. It makes me wonder: Are there other commonly held misconceptions around PC performance? Just like the RAID 0 issue—time will tell.

—GEORGE JONES
george@maximumpc.com

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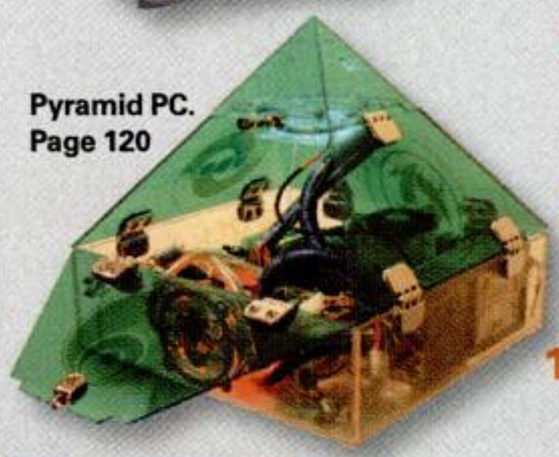

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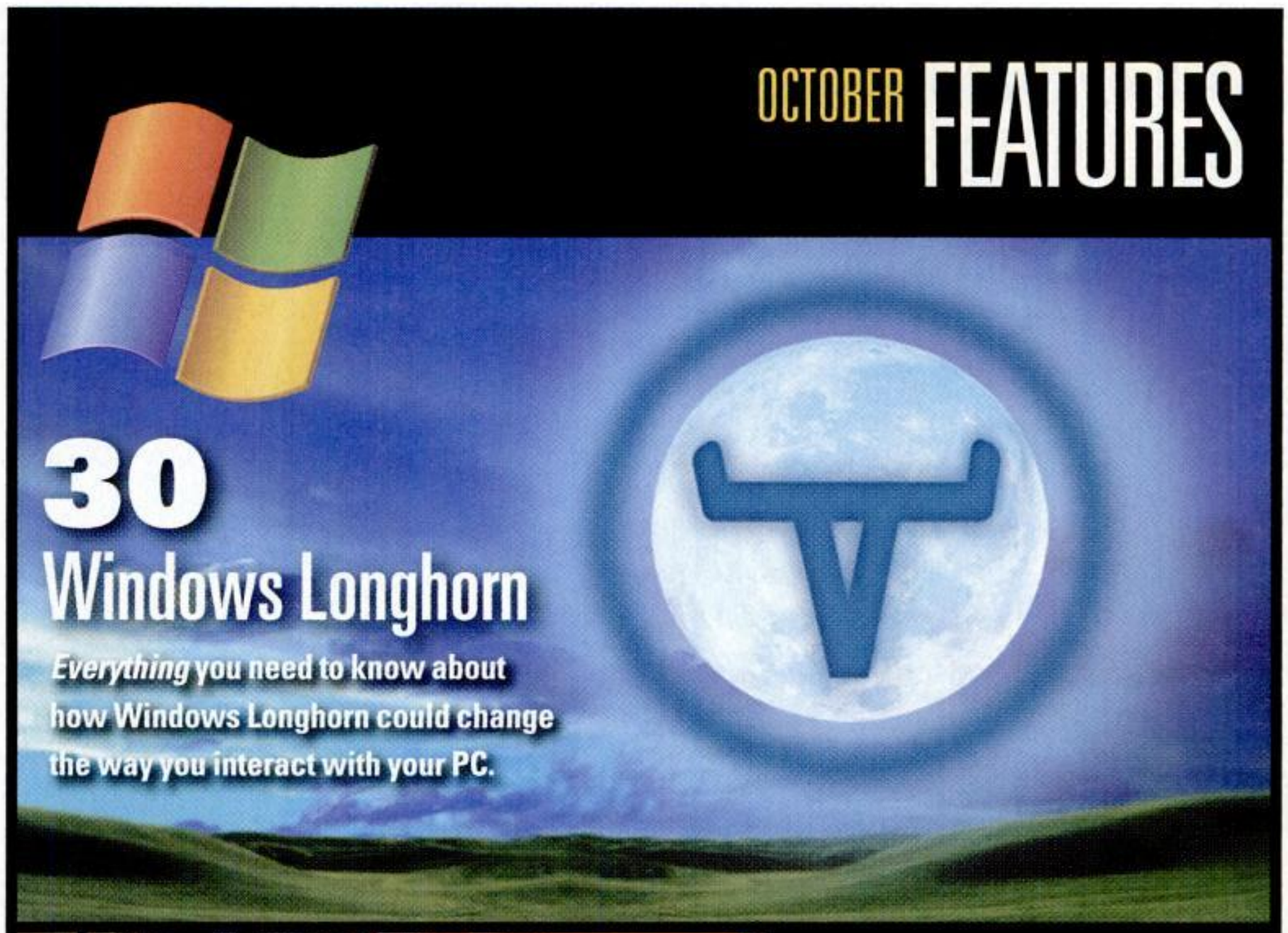

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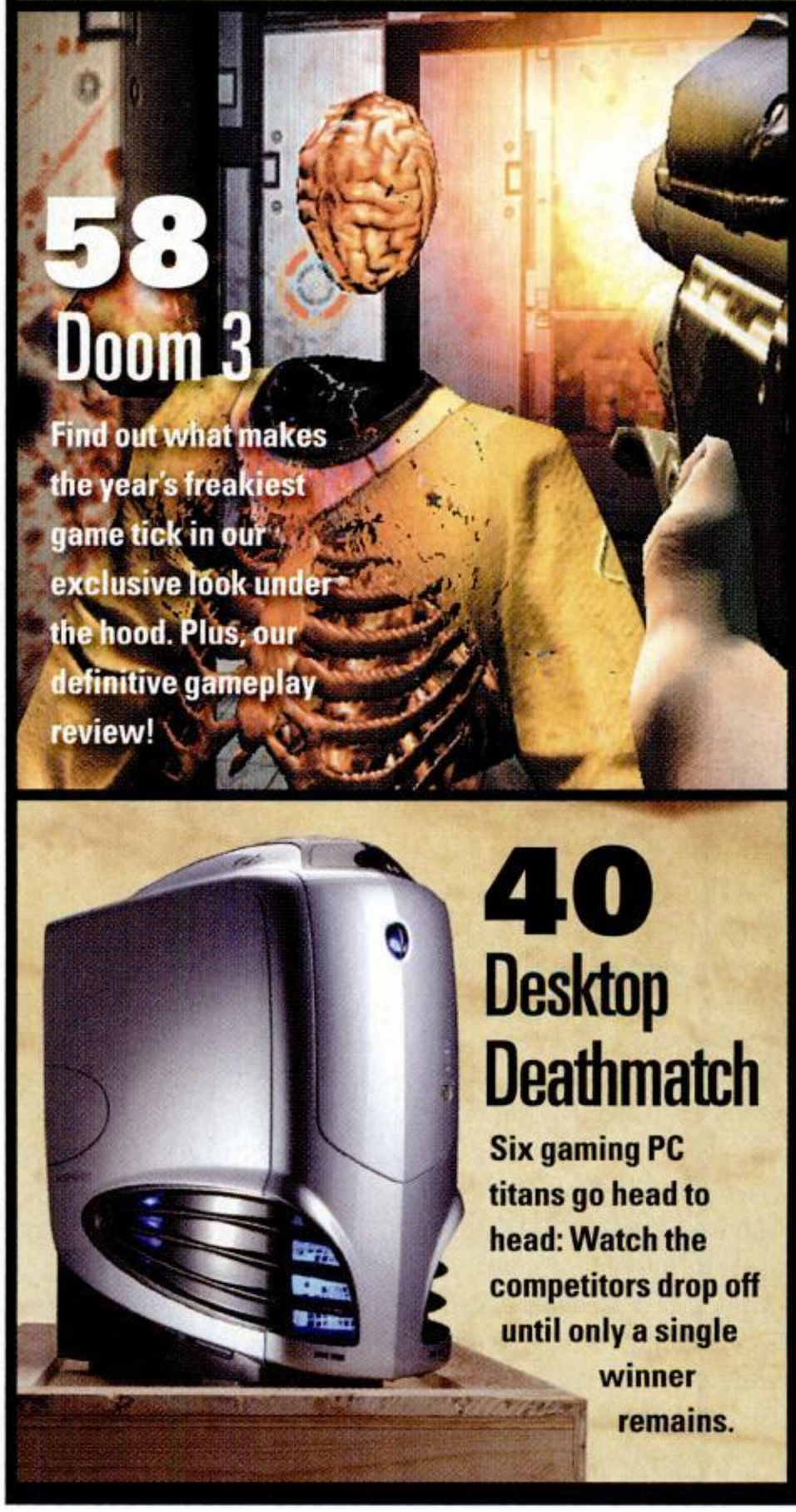

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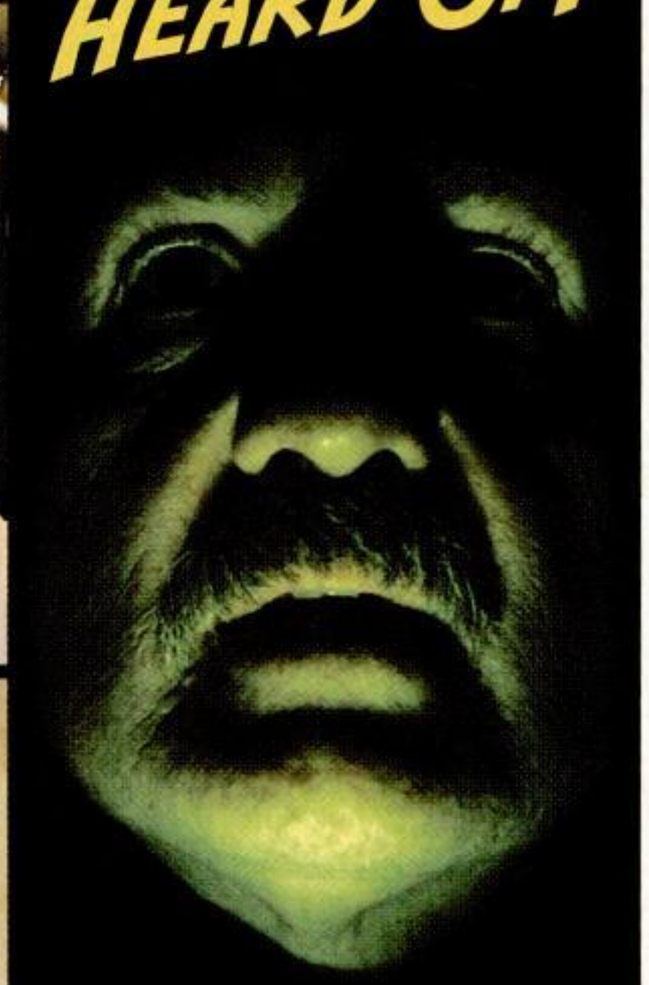

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In/Out

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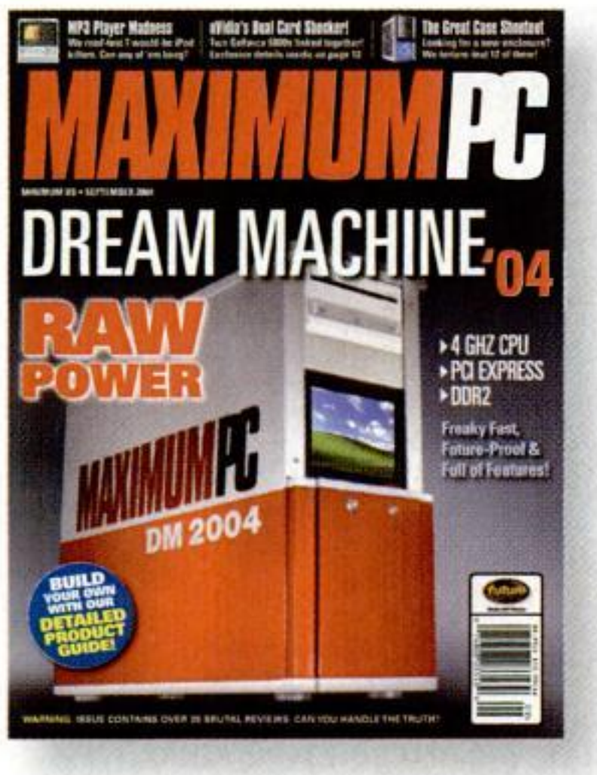

DREAM MACHINE LETDOWN

I've been reading your magazine for several years now, and I have always enjoyed the reviews and articles. I'm especially excited about your Dream Machine every year. This year however, I was very disappointed in some of the parts you chose. For starters, the theme to me seemed a cheap excuse to use an Intel platform. A "future-proof" Dream Machine? If I were building the best PC possible, I would not think about whether it would support parts three years down the road. For example, you stated in your magazine that ISA slots remained on motherboards for years after components stopped being made for them. Why would PCI-E be any different? Especially because I have a feeling AGP graphics cards will be made for many years to come. DDR2? Currently, miniscule advantages to DDR2 make it unnecessary, and the availability and price of DDR2 memory don't help.

Also, there's no reason to go with an Intel platform except for the fact that it may overclock more than an AMD—I'm sure you've seen the performance advantage of an AMD system over an Intel system in games such as *Doom 3*. And when I read which graphics card you picked, I could hardly sit still. The nVidia-based cards are currently more future-proof than any ATI product, with Pixel Shader 3.0 support and SLI capabilities.

—RYAN FLAGLER

I must say, it was a big letdown to see that you dropped the 6800UE videocard from your Dream Machine just because it took the extra slots. I thought the point of the Dream Machine was to have the best of the best—with nothing holding you back. The 6800UE was clearly the better choice then and definitely now. I banish you to the land of Fruitopia, to make me juice.

—COLIN HART

SENIOR EDITOR GORDON MAH UNG RESPONDS: So the backlash begins. No, not against us, but PCI Express, DDR2, and the Radeon X800. We've been around long enough to have seen this pattern before: "What? Why use PCI when VL Bus cards clock at 40MHz?"; "What? DDR is a joke, why would I want that over PC133?"; "What? Why bother with AGP when PCI cards are just as fast as AGP if not faster?"

We agree that AGP cards will be around for many years to come (shoot, you can still find PCI graphics cards), but we predict that the ultra high-end cards will need PCI Express in a mere 12 to 24 months. Similarly, in 18 months DDR2 will firmly occupy the high-end for both AMD and Intel. Believe me, if we could have secured a PCI Express chipset and board for Athlon 64 FX and a CPU that supported DDR2, we would have gone for it. Unfortunately, that wasn't the case.

And because the memory controller is embedded in the core of Athlon 64 FX chips (one of the key reasons they're so freaking fast), you would have to toss your motherboard *and* CPU to switch to DDR2 in 18 months.

As far as our choice of graphics card, it was a close, close contest. The 6800 Ultra and X800 XT Platinum Edition were virtually deadlocked on performance. We chose the X800 based on its svelte formfactor only—the cards performed about the same.

ANOTHER WAY TO GET 'TRUE' SURROUND

I have several questions concerning PC sound, in particular 5.1 surround sound. In last month's Dream Machine article, you stated that the Logitech Z-680 speakers were selected in part because they have both digital and analog inputs. This was said to be the only way to get "true 5.1 surround sound" from both DVD movies and games. Because you're using an Audigy 2 ZS Gamer soundcard, couldn't you just connect the analog outputs from the soundcard to the analog inputs of any amplified multimedia 5.1 speakers and get true surround sound? As long as the speakers have discrete analog inputs to front left and right, center channel, rear left and right, and subwoofer, all of the decoding would then take place in the soundcard. Creative says the Audigy 2 ZS is able to decode Dolby Digital (AC-3), DTS, and every flavor of game surround and enhancement I can think of, such as DirectSound, OpenAL, EAX, and A3D. Am I missing something?

ASSOCIATE EDITOR JOSH NOREM RESPONDS: You're not missing anything at all, Eric—you're perfectly correct. Because the Audigy 2 ZS soundcard includes a hardware decoder for Dolby Digital and DTS audio streams, we could certainly just plug the analog connectors from the Logitech Z-680 into the analog connectors on the Audigy and get discrete sound via the onboard decoder. Though our write-up certainly emphasized the presence of both analog and digital inputs, that was not the sole reason we chose the Z-680 system. The primary

WISE WORDS FROM THE SARGE

I was well aware that optical drive speeds today are high enough to shatter a CD but I worried about it happening to me about as much as I worry about getting hit by lightning. Well, it just so happens that I came across a CD containing some important data that had a tiny crack (no more than a centimeter) starting at the center of the disk. I figured, what the heck, I'll just drag off the CD any files that the drive can still read and burn a new CD with what I salvaged. Imagine the look on my face when I heard a sound like gunfire and breaking glass coming from my CD-RW drive. The enclosed image is what came out of the drive when my trembling finger hit Eject.

Fortunately, it was a cheap I/O Magic Magicspin 52/24/52 and not a prized possession like a Plextor DVD writer. But I did want to put the word out to anyone who might be tempted to try to recover a cracked CD: slow is better. *Nero* has a bundled program called *DriveSpeed* that I know would have helped. I hate hindsight.

—SSG JEFFREY JONES

FEATURES EDITOR LOGAN DECKER RESPONDS: You have our sympathies. Once you hear that awful sound, you never, ever feel safe again in this world. But take comfort in knowing that you may spare countless others the same trauma. Your suggestion of using *DriveSpeed* to back up data from damaged discs is a great one. For those who aren't familiar with it, *DriveSpeed* is a utility that comes with Ahead's *Nero*; it limits the read speed of your optical drive. You can find it on the installation CD, and also in the *Nero* directory on your hard drive under *Nero* Toolkit. If you notice cracks or flaws on the surface of a disc, use *DriveSpeed* to crank down the speed of the drive as low as it will go before attempting to back up the disc's contents. And while you're at it, you may want to put your pets in the other room.

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reason was: When it comes to sound quality, controls, and sheer sonic power, the Logitech Z-680 simply has no peer. Our write-up should have been clearer on this point.

MAXIMUM PC = NO 10 VERDICTS?

I have read your magazine since it was *boot* and I can't remember the last time you gave out a Kick Ass/10 verdict in a review. Maybe you never have. Do you guys look at *Playboy* magazine and say "Wow! Check out the 9 in this centerfold." My take is that you don't want to upset any potential advertisers by giving the competition any legitimate edge, so it's 9s for everybody. Did the Logitech Z-680 speakers in your Dream Machine even score a perfect 10 when you reviewed them?

—ED

EDITOR IN CHIEF GEORGE JONES RESPONDS: Ed, you're dead wrong. Over the course of the last nine months, we've given five perfect 10 verdicts to products we've reviewed. In fact, in our February issue alone, we gave three—count 'em, three—perfect scores. And we did indeed give Logitech's Z-680 speakers a 10.

But with this said, there are many more products that get 9 verdicts with a Kick Ass award. The reason is simple: The "perfect" product is as rare as the perfect movie or book, and we're more finicky than most when it comes to slight flaws and defects. Oh, and regarding your question about *Playboy*... we don't look at it. We read the articles.

ATI X800 XT PLATINUM DISCONTINUED?

Today I got a call from PC Connection, from whom I ordered my ATI X800 XT Platinum Edition, and was informed that ATI will not be manufacturing the X800 XT Platinum Edition because of an unexpectedly low number of chips that have 16 actual working pipes. Is this true?

—WAYNE PATTERSON

TECHNICAL EDITOR WILL SMITH RESPONDS: This sounded a little fishy to us, so we contacted ATI to find out the real story. We were told: "ATI has not discontinued the Radeon X800 XT Platinum Edition as erroneously reported on some web sites. We continue to ship Radeon X800 products to customers worldwide, including the Radeon X800 XT Platinum Edition. Because of the popularity and success of our Radeon products, meeting the strong demand is sometimes challenging. However, rest assured, we will continue to ship the Radeon X800 XT Platinum Edition and our full family of visual processors for gamers and computer enthusiasts!"

PENTIUM M IS NOT CENTRINO!

In the August issue of *Maximum PC*, you reviewed an Efficeon-based laptop—the Sharp Actius PC-MM20. Roughly halfway through the article, the following was written: "But the Efficeon's competition isn't the Crusoe, it's the ultra-low voltage version of Intel's Pentium M—known as Centrino."

This is not true! Pentium Ms and Centrinos are entirely different. Obviously, a Pentium M is a CPU used in laptops. Centrino, however, is wireless technology. A quote from Intel's web site reads: "The Intel Pentium M processor is a key component of Intel Centrino mobile technology...With Intel Centrino mobile technology, three components work together to enable outstanding mobile performance, extended battery life, and integrated wireless LAN capability in thinner and lighter notebooks. These components include the Intel® Pentium® M processor, the Intel® 855 chipset family, and the Intel® PRO/Wireless Network Connection Family."

Please do not propagate the idea that Pentium Ms are known as Centrinos. This is not true!

—JAKE CAMPBELL

SENIOR EDITOR GORDON MAH UNG RESPONDS: This is just semantics. Pentium M is the low-power consumption CPU that Intel makes for laptops. It's basically a P-III core on steroids and is one hell of a processor. Centrino is a combination of the Pentium M processor, the 855GM/PM/GME chipset, and one of Intel's wireless chipsets. Cynical folks would say the Centrino label is just a marketing method that helps Intel squeeze more cash from its customers. This is because laptop makers who build systems with the very fine Pentium M CPU and 855 chipset but opt not to use the Intel wireless chip can't call it a Centrino, even though the only difference is the wireless chipset—which many OEMs have told us is no different than other cheaper brands.

These same cynics shake their heads when they see or hear about people entering electronics stores asking for Centrino notebooks, because while Pentium M notebooks are just as good, it doesn't matter to some consumers, who have been suckered by Intel's hype. From our perspective, whether you buy Centrino or Pentium M, you still end up with a fine CPU—one just has a different sticker. ■

LETTERS POLICY: *MAXIMUM PC* invites your thoughts and comments. Send them to **input@maximumpc.com**. Please include your full name, town, and telephone number, and limit your letter to 300 words. Letters may be edited for space and clarity. Due to the vast amount of e-mail we receive, we cannot personally respond to each letter.

CUT, COPY, PASTE

➤ In "Browser Boosters" in the August issue, we gave the incorrect URL for Mozilla's update web site. The correct URL is updates.mozilla.org.

➤ Last month in "Tomorrow's Players Today," we incorrectly reported Creative Labs Zen Touch as having a 40GB capacity, when it has just a 20GB internal hard drive.

➤ Argh! Our worst nightmare as editors was realized when we saw that the WeWa Stanchion MP3 player, reviewed last month in the "MP3 Player Showdown," had an incorrect accompanying verdict. It should have received a 7 instead of a 3. We are humbled by the error.

MAXIMUM PC VERDICT: 7

COMING NEXT MONTH

IN THE

LIGHTLY-HYPENATED, REDUCED-VOWEL

NOVEMBER ISSUE OF

MAXIMUM PC

THE MODERN PC BUILDING SPECIAL

Bob Dylan said it best when he sang, "The times, they are a-changin'." This couldn't be more true of PC building these days, what with the advent of DDR2, PCI Express, new CPU sockets, and other fancy, newfangled gadgetry. We'll show you how to pick the best components at the best prices—and teach you the new rules of hardware installation. Stay tuned!

MEDIA CENTERS GALORE

Editor in Chief George Jones' home is literally flooded with Media Center PCs from all the major PC makers. Can the PC's foray into the living room compete with TiVo? Find out next month.

TRAUMA KIT 2004

Next month, we'll update *Maximum PC's* emergency toolkit. Everything you need to deal with a PC disaster will be inside.

PLUS

Super reviews: Four affordable printers duke it out for top ink-based honors, videocards, flat-panel LCDs, PDAs, MP3 players, and Microsoft's new Portable Media Center.

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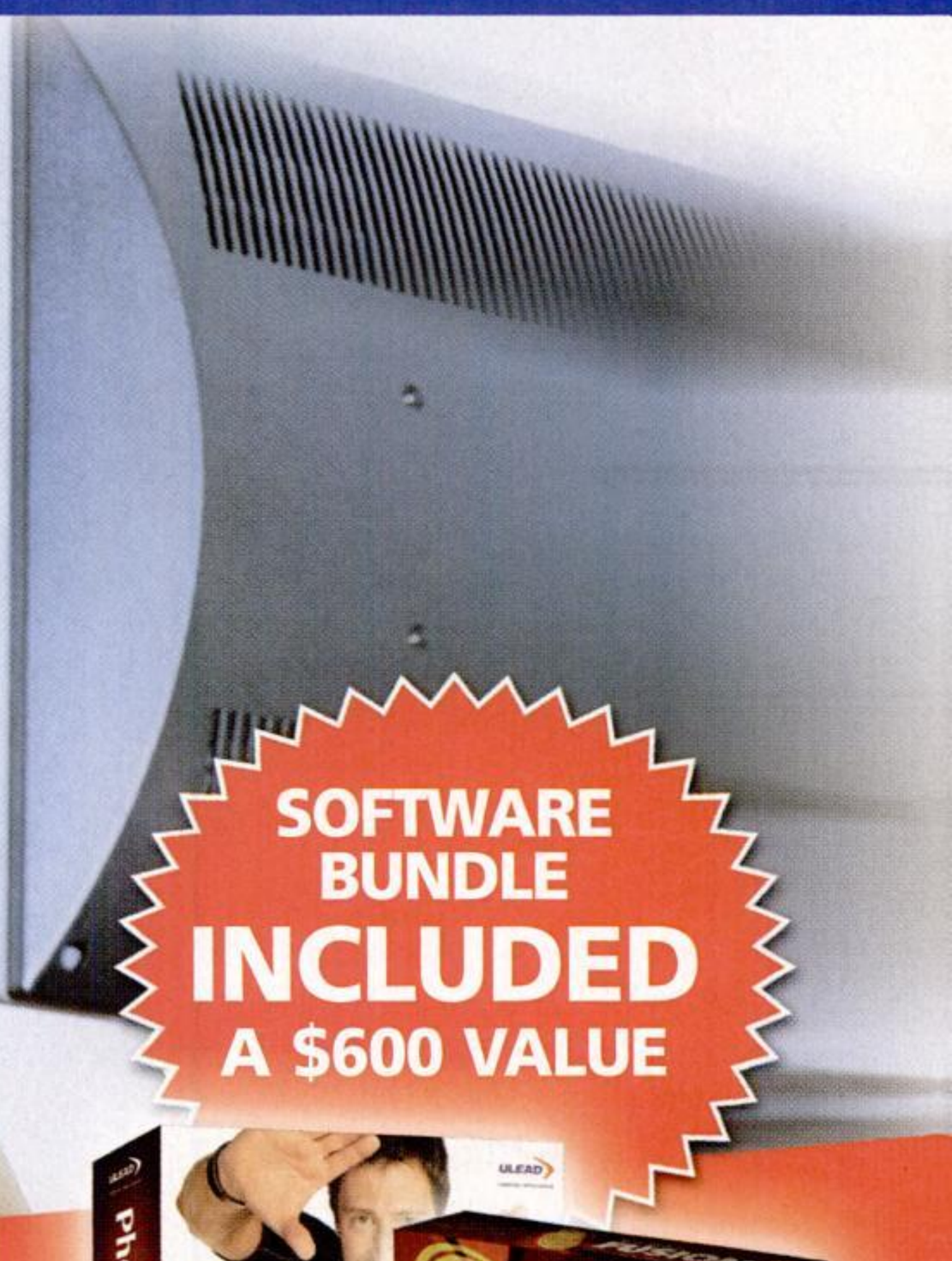

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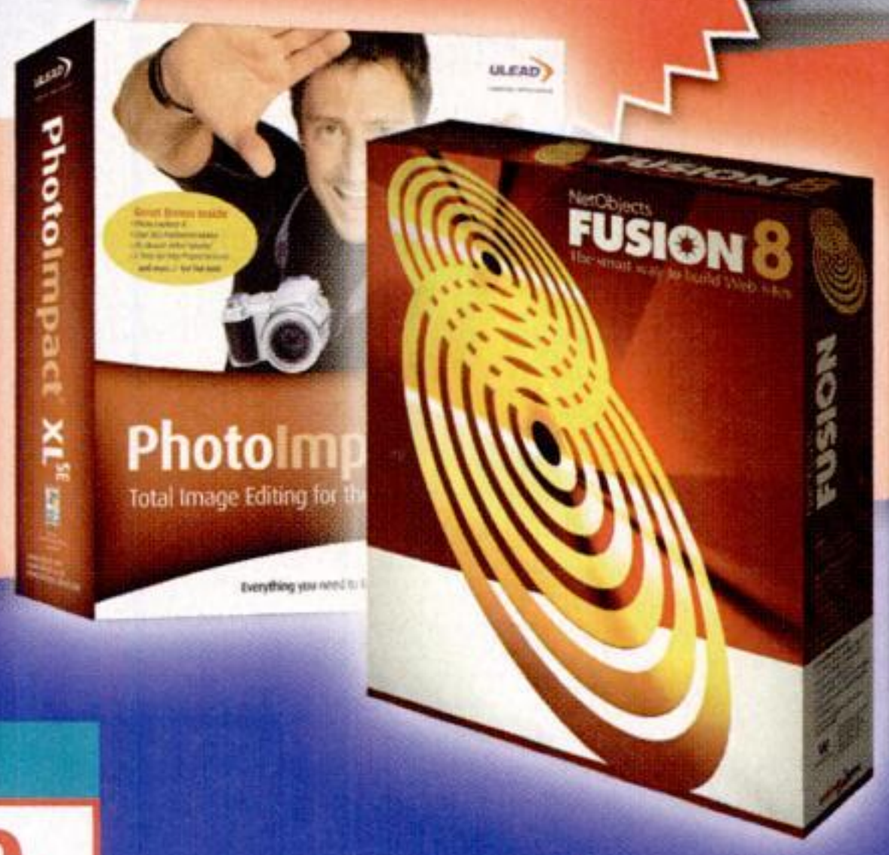

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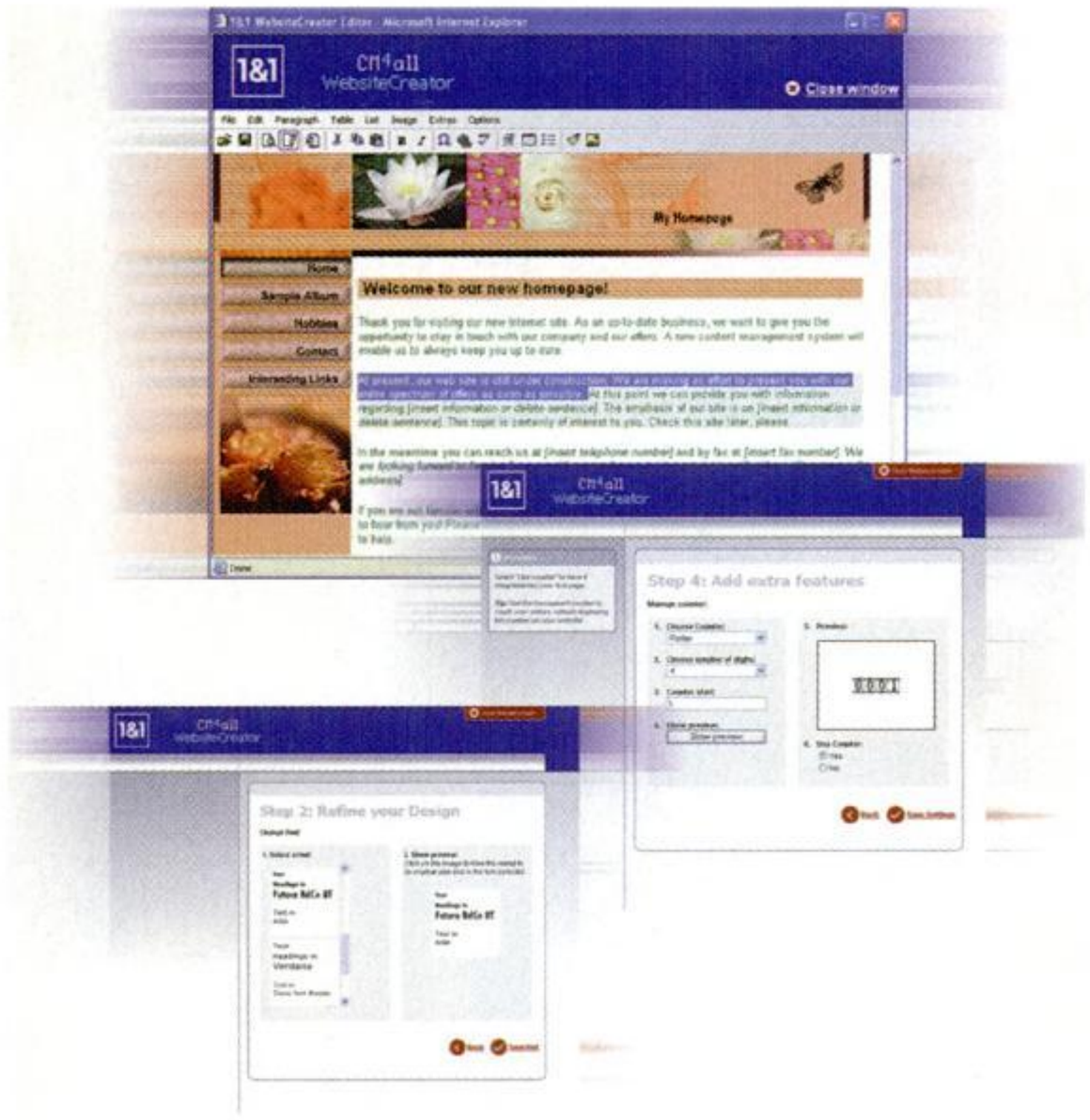

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MARKETING TOOLS		
1&1 Chat channels	1	1
1&1 WebStatistics	✓	✓
SITE-BUILDING TOOLS		
WebsiteCreator	12 pages	12 pages
Software bundle worth $600	✓	✓
FrontPage extensions	✓	✓
CGI library	✓	✓
Active Server Pages	–	✓
DOMAIN NAMES		
Included Domains	1	1
Subdomains	10	10
Run multiple independant sites	✓	✓
Full DNS management	✓	✓
E-MAIL		
POP3 accounts	50	50
Aliases, auto-responders, forwarding	✓	✓
1&1 WebMail	✓	✓
Symantec Virus Scanners	1 account	1 account
SECURITY FEATURES		
Protected by up-to-date firewall	✓	✓
Daily backups	✓	✓
Password protected directories	✓	✓
Dedicated SSL Certificate	optional	optional
PER MONTH	$4.99	$6.99

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PACKAGE FEATURES		
Web space	1,000 MB	1,000 MB
FTP accounts	5	5
Monthly Transfer Volume	50 GB	50 GB
1&1 Control Panel	✓	✓
Logfiles	✓	✓
MARKETING TOOLS		
1&1 Chat channels	5	5
1&1 WebStatistics	✓	✓
In2site Live Dialogue	✓	✓
1&1 Newsletter Tool	✓	✓
1&1 WebElements	✓	✓
SITE-BUILDING TOOLS		
WebsiteCreator	18 pages	18 pages
Software bundle worth $600	✓	✓
FrontPage extensions	✓	✓
CGI library	✓	✓
Active Server Pages	–	✓
ASP.NET, .NET Framework	–	✓
Perl, PHP3 and PHP4	✓	–
1&1 WebDatabase	✓	✓
Database	1 MySQL	MS Access
Cron Jobs	✓	–
SSI (Server side includes)	✓	✓
DOMAIN NAMES		
Included Domains	3	3
Subdomains	50	50
Run multiple independant sites	✓	✓
Full DNS management	✓	✓
E-MAIL		
POP3 accounts	150	150
Aliases, auto-responders, forwarding	✓	✓
1&1 WebMail	✓	✓
Symantec Virus Scanners	3 accounts	3 accounts
SECURITY FEATURES		
Protected by up-to-date firewall	✓	✓
Daily backups	✓	✓
Password protected directories	✓	✓
SSH Secure Shell Access	✓	–
Dedicated SSL Certificate	optional	optional
PER MONTH	$9.99	$12.99

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PACKAGE FEATURES		
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FTP accounts	25	25
Monthly Transfer Volume	100 GB	100 GB
1&1 Control Panel	✓	✓
Logfiles	✓	✓
MARKETING TOOLS		
1&1 Chat channels	10	10
1&1 WebStatistics	✓	✓
In2site Live Dialogue	✓	✓
1&1 Newsletter Tool	✓	✓
1&1 WebElements	✓	✓
SITE-BUILDING TOOLS		
WebsiteCreator	25 pages	25 pages
Software bundle worth $600	✓	✓
FrontPage extensions	✓	✓
CGI library	✓	✓
Active Server Pages	–	✓
ASP.NET, .NET Framework	–	✓
Perl, PHP3 and PHP4	✓	–
1&1 WebDatabase	✓	✓
Database	3 MySQL	MS Access, MS SQL
Cron Jobs	✓	–
SSI (Server side includes)	✓	✓
Advanced Developer Tools	✓	–
DOMAIN NAMES		
Included Domains	5	5
Subdomains	200	200
Run multiple independant sites	✓	✓
Full DNS management	✓	✓
E-MAIL		
POP3 accounts	300	300
Aliases, auto-responders, forwarding	✓	✓
1&1 WebMail	✓	✓
Symantec Virus Scanners	6 accounts	6 accounts
SECURITY FEATURES		
Protected by up-to-date firewall	✓	✓
Daily backups	✓	✓
Password protected directories	✓	✓
SSH Secure Shell Access	✓	–
Dedicated SSL Certificate	✓	✓
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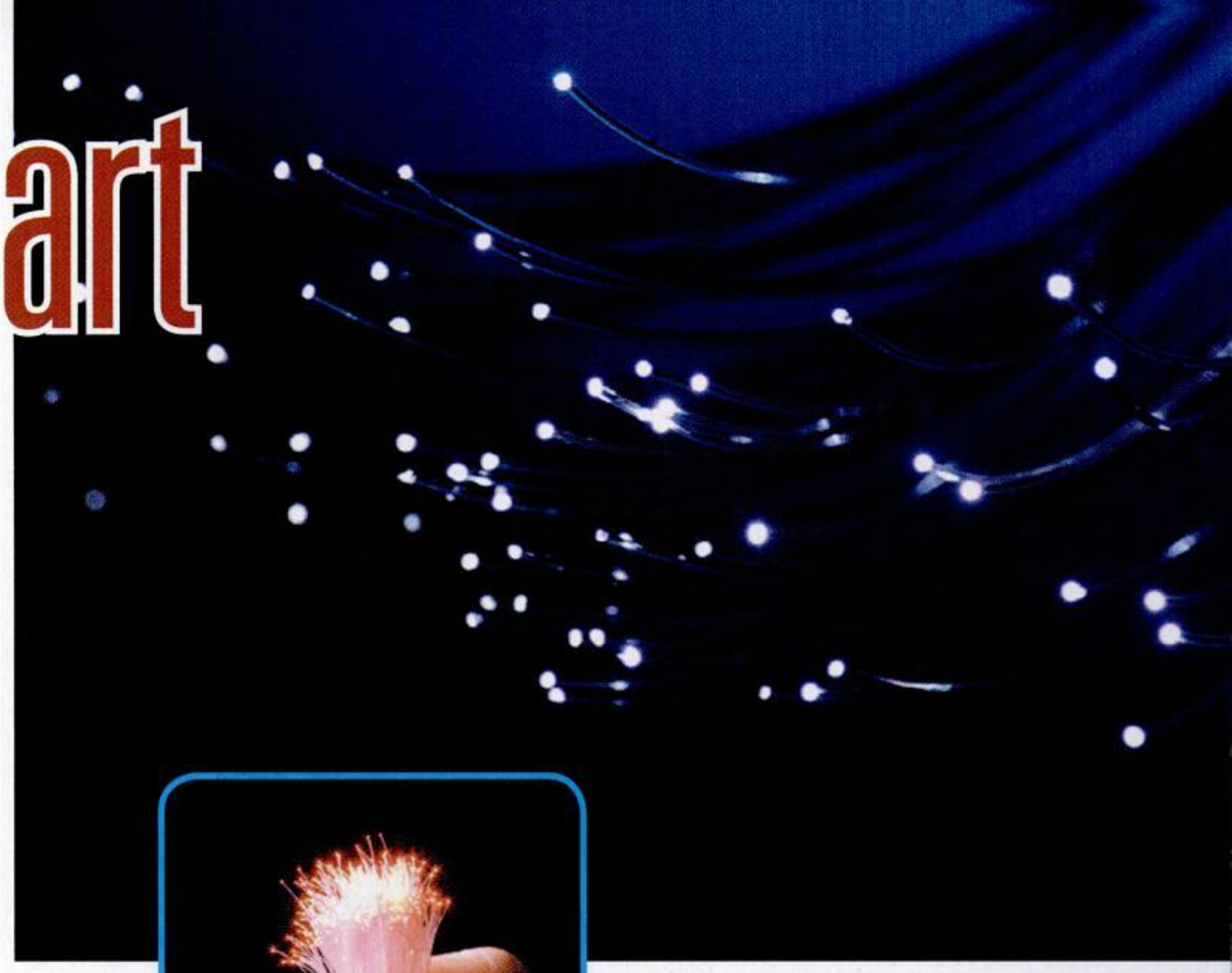
QuickStart

The beginning of the magazine, where articles are small

Verizon Rolls out 5Mbps Broadband

A fiber optic–based broadband alternative may be coming soon to your apartment, condo, or commune



The copper stopper: Fiber optic cables may be your ticket to cheap broadband.

Fashionistas love to flaunt their Prada shoes. Rappers pile on the bling until their sparkle is blinding. Corporate honchos throw parties with ice sculptures that pee vodka. So what do geeks do to establish their place on the food chain? They boast about their fat broadband connections.

But pricey 1.5Mbps connections are looking mighty foolish in Keller, Texas these days. That's where Verizon first introduced its fiber-to-the-premises (FTTP) broadband service, and it's hardly an emblem of privilege for the grossly wealthy. Instead, residents are capable of pulling down an astonishing 5Mbps for as low as $35 a month.

Verizon is delivering these truly decadent speeds using fiber-optic cables that transmit voice, data, and video. And the company tells us that speed isn't the only advantage offered by fiber-optic transmission. Unlike cable, bandwidth isn't shared among customers, and unlike DSL, you don't have to be close to a central office (CO) to get optimal performance.

Verizon is calling its service Fios (pronounced FYE-ose, an incantation we've confirmed doesn't open a portal to Hell), and is already expanding its service to California and Florida. The pricing scheme, which the company tells us is not merely an introductory offer, touts 5Mbps/2Mbps (downstream/upstream) for $39.95 a month as a stand-alone package, or $34.95 a month as part of a local and/or long-distance calling plan. You'll also be able to get a 15Mbps/2Mbps connection for $44.95 a month as part of a calling package, or $49.95 a month stand-alone.

Pricing for 30Mbps/5Mbps will be announced later.

Data service packages include up to nine e-mail accounts with 30MB of storage for the primary account and 10MB for each sub-account, an address book and calendar, 10MB personal web space, a web site building tool, and access to newsgroups.

We've always said that bandwidth is like dollar bills—you can never have enough. If a year's worth of ultra high-speed broadband costs less than a pair of Prada shoelaces, so much the better.

30 SECONDS WITH VERIZON'S BROADBAND

5Mbps is a big trade-up from today's swanky 1.5Mbps broadband connections. Here's how much faster you'll get these non-copyrighted works available on the Internet (assuming the server can deliver the goods at these rates as well):

Internet download	1.5Mbps	5Mbps
Microsoft Windows Service Pack 2 (from **www.microsoft.com**, 266MB)	24 minutes	7 minutes
Human genome sequence data (from UCSC Genome Bioinformatics, **http://hgdownload.cse.ucsc.edu/downloads.html**, 894MB)	1 hour, 22 minutes	24 minutes
DVD Archive of 9400 classic texts (from Project Gutenberg, **www.gutenberg.net/cdproject/**, 4.1GB)	6 hours, 20 minutes	1 hour, 8 minutes

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Introducing the AMD Sempron

AMD replaces its aging Duron fleet with a new set of CPUs. Here's a breakdown of the new line of budget processors

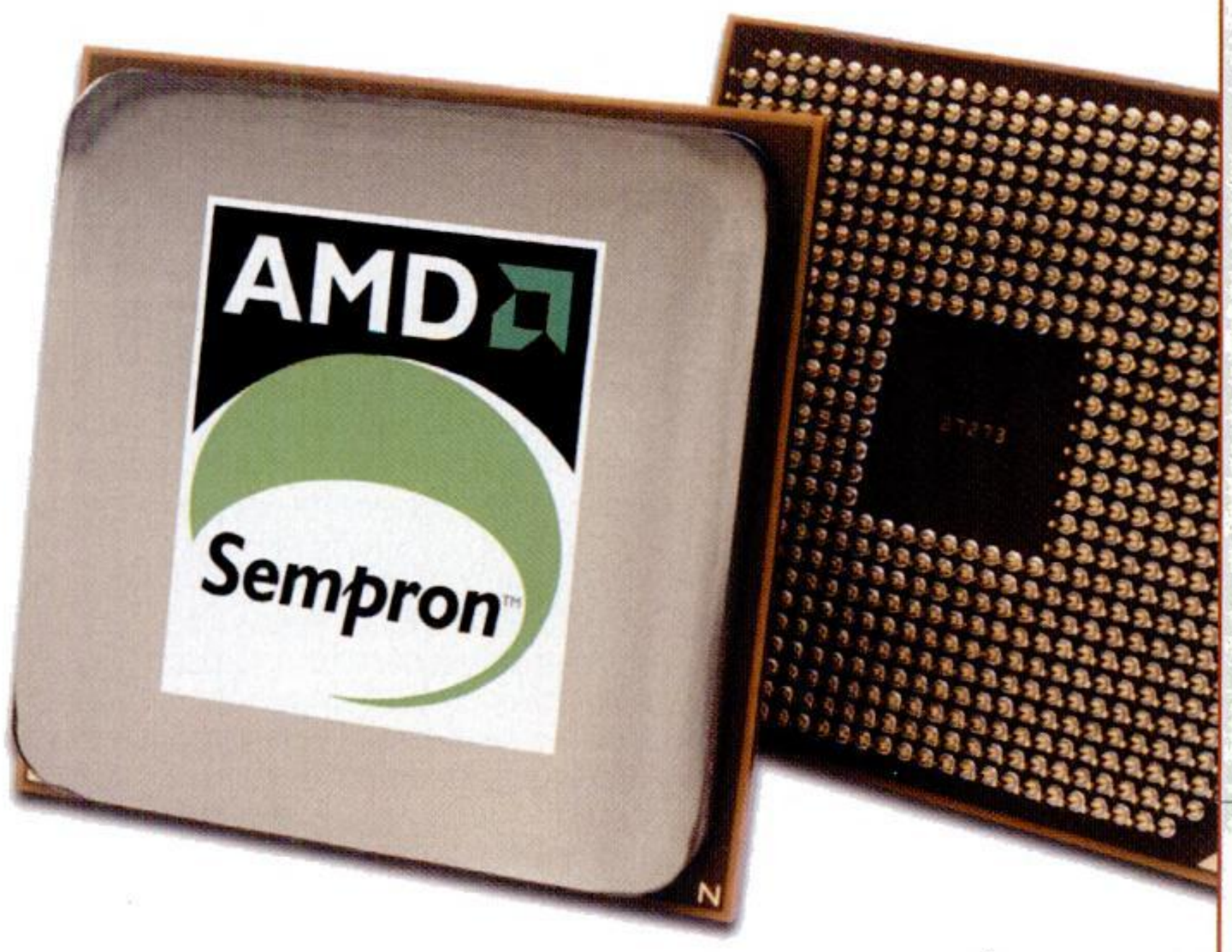
AMD has finally replaced its moribund budget Duron brand with a CPU the company hopes will smack down Intel's low-cost Celeron family.

Sempron processors (adapted from *semper*, the Latin word for "always"), are currently shipping in speed ratings of 3100+, 2800+, 2600+, 2500+, 2400+, 2300+, and 2200+. The chips themselves are based on two cores: the older K7 core used in the Athlon XP and the current K8 core used for Athlon 64 and Athlon 64 FX.

Of the initial CPUs destined for the desktop, only the 3100+ uses the K8 core and fits into Socket 754 motherboards. Everything else fits into Socket A mobos. The 3100+ ticks along at 1.8GHz and features 128KB L1 cache and 256KB L2 cache. (Current Athlon 64s feature cache sizes of 512KB and 1MB.) One distinct difference between the two CPU types is 64-bit support; only the mobile versions (3000+, 2800+, 2600+) will support 64-bit operating systems.

The fastest Sempron based on the Athlon XP core, the Sempron 2800+, clocks in at 2GHz and has 128KB of L1 cache and 256KB of L2 cache. (In comparison, the fastest Athlon XP, the 3200+, features 512KB of cache.) Socket A Semprons will also be limited to 333MHz frontside bus speeds, whereas the 3200+ supports a 400MHz frontside bus. But don't get hung up on the clock frequencies and cache sizes—AMD says clock speeds and cache sizes may vary within each family of CPU, meaning the 3100+ could have a higher clock speed and more cache at some point in the future.

AMD says Athlon XP and Socket A will be supported at least through 2005, and while there's been considerable speculation that the company would dump the Socket 754 platform, officials say further versions of Athlon 64 for the platform are planned.



FAST FORWARD BY TOM R. HALFHILL

NX: No Excuse for Poor Security

AMD and Intel are trumpeting a new security feature built into their latest x86 processors: the NX bit. This is like bragging about installing new locks on your doors after having left the house wide open with a sign out front announcing, "Burglars Welcome."

The NX (No Execute) bit is a small but much-needed improvement to PC security. Essentially, it allows the processor to declare certain regions of memory off-limits for program execution. If a program tries to execute instructions stored in memory marked with the NX bit, the processor's memory-management unit (MMU) will trigger an exception—a high-priority error signal. The operating system will immediately halt all other programs and terminate the offending program, or ask if you want to terminate it.

The NX bit is a partial solution for viruses, worms, and Trojan-horse programs that try to substitute their own malicious instructions for genuine software code. The attacking program invades your computer, usually through infected e-mail, and most commonly tries to exploit a vulnerability known as "buffer overflow." A buffer is a chunk of memory set aside for receiving or sending data. By deliberately overstuffing it, the attack overwrites some memory beyond the buffer with new instructions. Later, when a trusted program accesses that memory for a legitimate purpose, it is tricked into executing the new instructions. Wham! Your computer is now at the mercy of the attack program—unless your system has protected the overwritten memory by setting the NX bit. Note that the NX bit can't prevent the intrusion, but it can stop the sabotaged code from running.

But while the NX bit sounds brilliant, it shouldn't be necessary. It's a stopgap solution for sloppy programming, obsolete programming languages, and the shunning of features that were already built into x86 processors more than 20 years ago.

Programmers deserve blame for writing crappy code and for ignoring software tools that guard against buffer overflows. The leading programming languages for commercial software development (C and C++) deserve blame because they lack the safety of modern languages like Java and C#. And the x86 vendors deserve blame because their early processors, like the 8086 (1978) and 286 (1982), had memory protection that could prevent these attacks—but programmers didn't like the restrictions, so later x86 chips made the protection unnecessary.

We should be grateful for the NX bit, because it will definitely help. But don't be so grateful that you kiss anyone's feet.

Tom Halfhill was formerly a senior editor for Byte *magazine and now an analyst for* Microprocessor Report.

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Introducing Tablet PC 2005

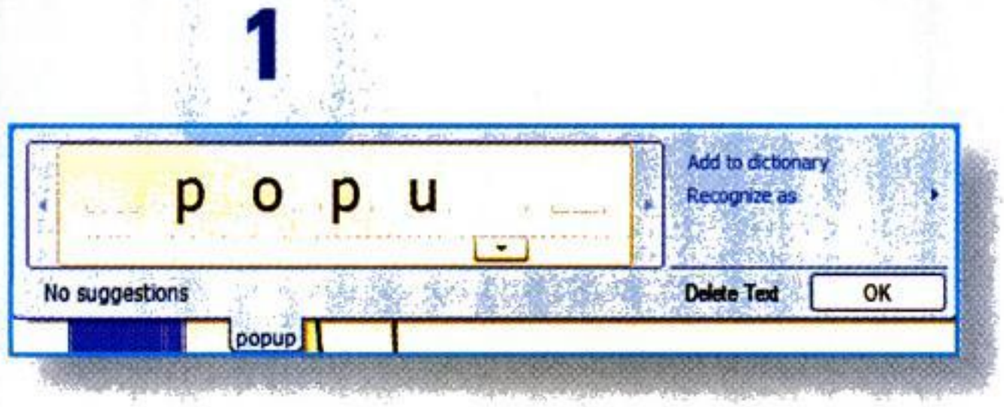
Install Service Pack 2 on your Tablet PC, and you get more than a firewall and security updates—you also get updated and much improved handwriting recognition software

The release of Service Pack 2 for Windows XP heralds the first update to Microsoft's Tablet PC software. At first glance, the changes appear no more than cosmetic, but in fact Microsoft has made significant improvements to the way the OS recognizes handwriting. Here's what to look for!

1. Correcting your mistakes

If the tablet misidentifies one of your words, you can click on the word in the input panel and make any corrections. In this panel you can also add any words that aren't in the dictionary to your custom dictionary, which

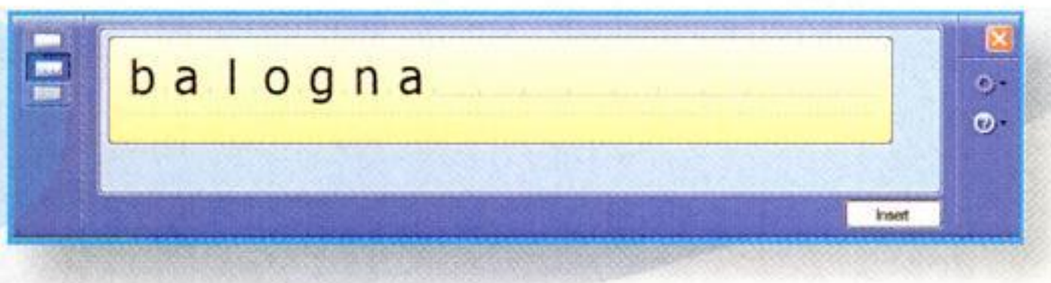
1



2. Taking a page from the Pocket PC

One of our chief complaints with the original Tablet PC software is that it completely ignored many of the features that make inputting text on the Pocket PC quick and easy. The new improved character recognizer makes it easy to write characters one at a time to ease manual input of hard-to-recognize words, characters, or numerals.

2



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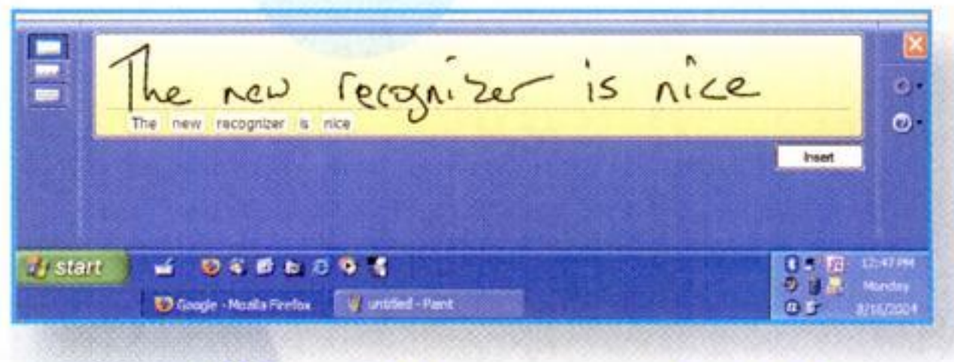


3. Recognizing one word at a time

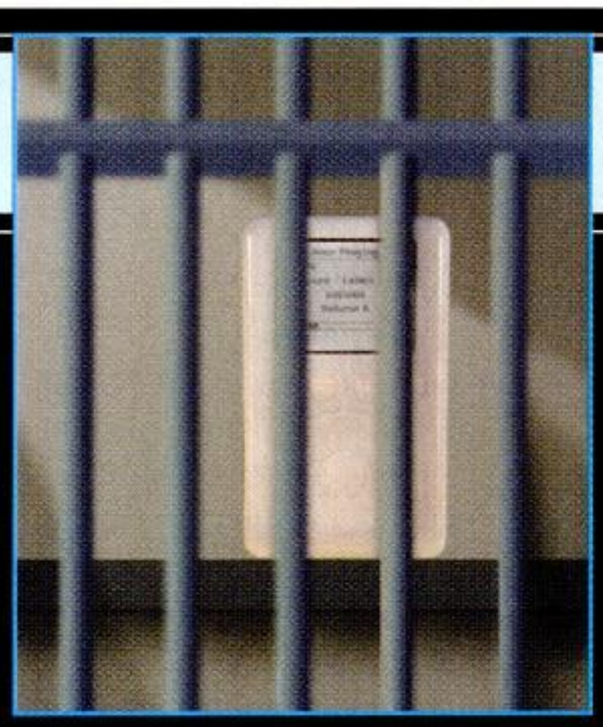
The new writing panel—where you can write sentences in normal handwriting for the tablet to recognize—gives you immediate feedback regarding your entry. Every time you write a word, the tablet displays its interpretation of the word underneath your handwriting.

4

4. Popping up all over the place

One of our favorite new features is the popup input panel icon. Anytime you put your cursor inside a box where you can write text, the input panel icon pops up. Tap it, and your preferred input panel pops up right at your cursor.

FUN-SIZE NEWS



LEGISLATION INDUCES VOMITING

Senators Orrin Hatch (R-Utah) and Patrick Leahy (D-Vermont) recently proved that idiocy is indeed bipartisan by sponsoring the Inducing Infringement of Copyrights Act (also known as the INDUCE Act). Under this sterling piece of legislation, it would be a crime to aid, abet, or "induce" copyright infringement. Although the Electronic Frontier Foundation has pointed out that this rather broad bill would make the Apple iPod, Toshiba's miniature drive in the iPod, and even a review of the iPod subject to criminal penalty, Hatch cheerfully promises that the bill is only intended to go after the "bad guys," such as the makers of file-sharing applications. If you believe him, don't call him at 202.224.5251, or Senator Leahy at 202.224.4242.

SEAGATE CRANKS UP WARRANTIES TO FIVE YEARS

While other hard drive manufacturers are trimming the warranties for their products, Seagate is moving in the opposite direction. As of June 1, any drive made by Seagate is guaranteed for five years. This covers what Seagate anticipates to be the expected "service life" of the drive. This doesn't mean that the company expects its drives to keel over after five years, but instead represents the extreme upper-end of the amount of time most people will find the drive useful in speed and capacity.

READY FOR THE BD-ROM?

The Blu-Ray Disc Association (BDA) has put its stamp of approval on BD-ROM, the read-only disc specification intended for high-definition movie distribution that uses Blu-Ray technology. Sony Pictures Entertainment is the only major studio that has pledged support for the standard, which isn't surprising considering that Sony is leading the charge of this nascent technology. BD-ROMs will soon be going head to head with three other specs: HD-DVD (High Definition DVD) promoted by a group called the DVD Forum, FVD (Forward Versatile Disc) from Taiwan, and EVD (Enhanced Video Disc) from China.

NAME THAT FERRET

If you hurry, you can make the September 30 deadline to go to www.playitcybersafe.com, where you'll be able to vote on a name for the "copyright-crusading" ferret that's used by the Business Software Alliance to teach children about "the importance of protecting and respecting copyrighted works." Sounds good to us, but shouldn't the organization's mascot be an elephant, who never forgets about fair use rights?

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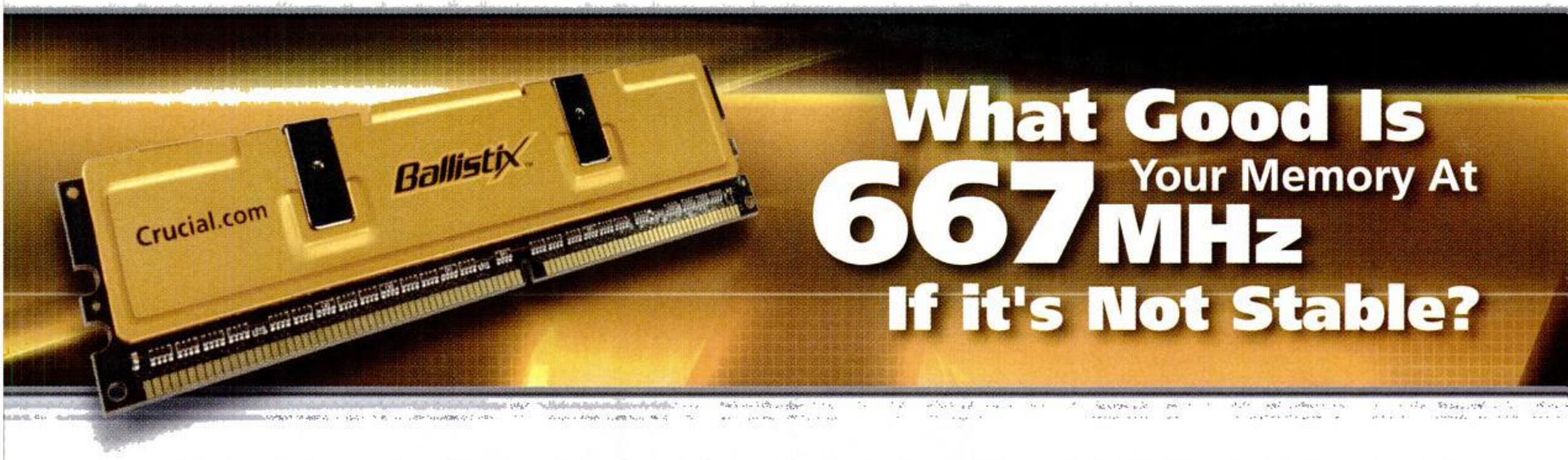
What Enthusiasts Ought To Know About Performance Memory:



What Good Is Your Memory At 667 MHz If it's Not Stable?

Memory is memory, right? Actually, no! Inferior performance memory can wreak havoc on your system. The blue screen of death, software crashes, driver and operating system hiccups—all can be caused by bad memory modules.

As you increase the operating frequency of your FSB, the quality of the system components becomes increasingly important. When the FSB frequency increases, the allowable margin of error decreases, and a small variance outside accepted tolerance levels can result in stability issues and cause system problems like the ones mentioned above. As an enthusiast, you need memory that consistently meets the performance demands of your system.

Crucial's new Ballistix™ high-performance memory line is designed specifically for computer gamers and power users seeking maximum system performance and stability. Featuring advanced speed grades, low latencies, and integrated aluminum heat spreaders, Ballistix™ modules deliver the powerful performance you want and the stability you need*.

Doom 3™ Is Here!
But Is Your Computer Ready?

The geeks in the Crucial Performance Lab have put Doom 3™ to the test! Download the complete test results and find out how to get your system Doom 3™ optimized.

www.crucial.com/doom

But don't take our word for it. Anandtech, the leading online IT source for hardware analysis and industry news, was so impressed with Ballistix™ DDR400 in their August 4, 2004 DDR400 roundup, they claimed it "showed the most incredible timings that we have ever seen for any memory" and went on to award it the Gold Editors Choice for Best Performance. Anandtech.com, editor Wesley Fink said, "Crucial® Ballistix™ is the first memory that we have tested to achieve consistent, stable DDR timings of 2.5-2-2 at DDR500, in addition to the incredible range of usable timings at the most aggressive 2-2-2 timings. What can we say about Crucial's Ballistix™ that does DDR500 at 2.5-2-2-5? The only word that comes to mind is 'astounding'!"

editors choice

While other memory sellers might offer a cumbersome list of compatible processors and motherboards, Crucial provides the award-winning Crucial® Memory Advisor™ tool, an easy-to-use, searchable memory database. In just three easy clicks, the Crucial® Memory Advisor™ tool finds exactly the right Ballistix™ module for you—compatibility guaranteed.

To find exactly the right Ballistix™ memory for your system and to download the Doom 3™ performance test results visit:

www.crucial.com/doom

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GAME THEORY BY THOMAS L. McDONALD

Doom and Gloom

***Doom 3* is a weird trip through the game design Wayback Machine. Even with undeniably gorgeous visuals cranked out by a videocard several times more powerful than the computer I used to play the original *Doom*, there is something so very 1994 about the whole experience. Graphically, that 10-year gap is the difference between Lascaux and DaVinci. The game itself, however, is mired in a strange retro sameness that mingles fan-service with current first-person shooter trends to come up with… well, very little, actually.**

The whole experience is oddly jarring, as though *Doom 3* collided with the design doc for another game. Unlike prior id Software games, there is an attempt to create the active, heavily scripted environments characteristic of modern shooters. The integration of cutscenes is often breathtaking, as third-person cinematics seamlessly segue into first-person action set pieces. Moments of sustained tension are punctuated by sudden terror, with a pace that madly veers from frenzied run-'n'-gun to moody unease.

Yet, in no time at all, you begin to sense the game's patterns; even worse, you begin to anticipate them. The event triggers are obvious and repetitive. You don't pick up anything without waiting for the lights to go out or a hidden door to pop open and unleash some nameless horror. After an hour or two, this runs smack into the law of diminishing returns.

And, yes, it's too damn dark. While the darkness does create some moments of true fear, it creates many more moments of pure frustration. An imp charges, you clumsily switch from flashlight to shotgun, and you suddenly realize that until the imp fires another blast, you won't be able to see him at all. Tense? Sure. Fair? Not so much, no.

Fans don't want a Golden Oldies Revival. Action games have gotten better, but instead of crafting a contemporary, post-*Half-Life*-style action experience from the ground up, *Doom 3* feels more like a conventional id game with a storyline and triggered events squeegeed over the surface. The result is a bit like a little girl who gets into mommy's makeup box.

None of this is really surprising. Id changed the face of gaming once, and that was enough. Every game since has been like a tech demo for a better game, and we know that better games will come from developers who take this engine and turn it into something great. Think of id as Fender Guitars: Only they can make a Stratocaster, but it takes Clapton to make it sing.

Tom McDonald has been covering games for countless magazines and newspapers for 11 years. He lives in the New Jersey Pine Barrens.

The Strange World of USB, Vol. 2

What's in your port?

"Only in Japan." Or so we thought when we first showed you such freakish accessories as the USB-powered electric toothbrush and the USB-powered lap blanket (Quick Start, May 2003). But alas, the comfort, companionship, and hygiene potential of the USB port has made its way to the States. Here are a few items that put the "universal" in the universal serial bus.

The Mini Aquarium

Pets are great fun until they barf, poop, or contract a raging case of *Ichthyophthirius* around the fin. Well, those are yesterday's problems—these feisty fish live entirely off the power of your USB port! Fill the tank with water and drop in the two, uh, *artifishal* buddies included in the box, and all day long you can watch them float and frolic in the ethereal glow of a bright blue LED light. Create your own imaginary dialog between the two, or dump in a batch of Sea Monkeys for a startling desktop centerpiece. Distributed by the Delta Global Crew (no relation to J. Crew).

$22, http://usb.brando.com.hk

Let's see Nemo get out of this one!

The Clean Ion

Air ionizers, we're told, dispatch a stream of negatively charged ions into the air, which cling to airborne pollutants with some mystical force. The weight of the combined bulk pulls said pollutants down to the nearest surface and away from your delicate respiratory system. Does the technique work? Europeans seem to think so, but they smoke in elevators, so we'll take their medical advice with a grain of salt. Nonetheless, the USB-powered air ionizer may at least bring some peace of mind to obsessive-compulsive hand washers and germophobes who regard their office environs as being just slightly less lethal than a gas chamber.

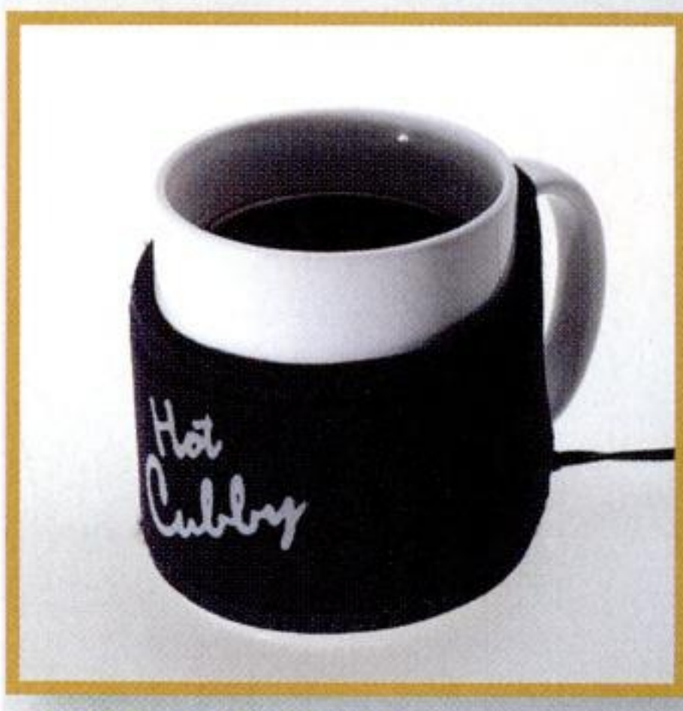
$30, www.thinkgeek.com

Does your cubicle meet the air-quality standards of your community?

The Hot Cubby

It's a cup warmer. Does it really need a fancy description? Even though it's tailored with a cute slot for the cup handle, don't let that stop you from laying it flat and using it to warm your Egg McMuffin, or inserting it in each of your slippers before getting out of bed. It's just our opinion, folks, but you may want to think twice before tethering a hot cuppa joe to your laptop.

$13, www.addlogix.com



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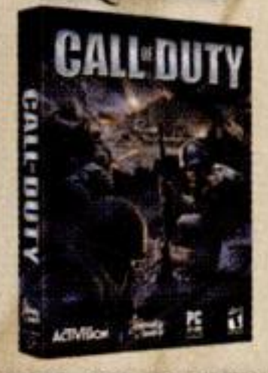

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activision.com

TechnoFile

Quick takes on technology trends

Belkin's Trilingual Wireless Router

We wanted faster wireless network speeds, and now we've got them. Unfortunately, the trade-off has been multiple wireless standards that aren't compatible with each other. And, as anyone with an 802.11b device in an 802.11g home can attest, even when these standards do cohabitate, data transfer speeds plummet to the lowest standard attached to the network. Not cool.

Thankfully, Belkin is attempting to bring us out of the Dark Ages of wireless networking. The company's Pre-N Wireless Router ($180, www.belkin.com) is capable of working with mixed 802.11b and 802.11g without dropping speeds to the lowest common denominator, and has the potential to reach speeds up to 108Mbps using a technology called MIMO (Multiple Input Multiple Output). MIMO is currently among the technologies under consideration for use in the 802.11n spec (hence the "Pre-N" badge) and is a groovy front-runner thanks to its increased compatibility, higher speeds, and up to 200 percent increase in range over 802.11b or 802.11g.

Someday, Cat-5 Ethernet cable will seem as quaint as rotary dial telephones. Wethinks that day just got a lot closer.

The Pre-N Wireless Router allows 802.11b, 802.11g, and 802.11n networks to live in harmony, without collapsing to the lowest transmission speed among them.

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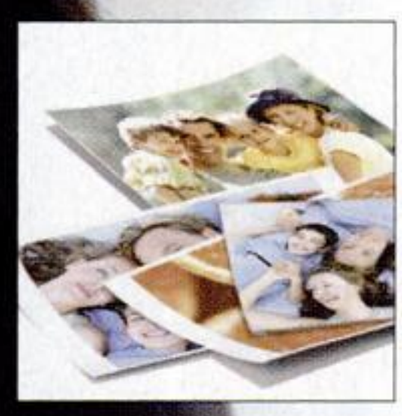

©2004. Fisher Multimedia. All rights reserved. LCD screen image is simulated. As of October 1, 2003 the Fisher FVD-C1 CameraCorder™ is the world's smallest/lightest high-resolution MPEG-4 video camera and 3.2 megapixel digital still camera combined in one unit for consumer use.

One Camera, Twice The Enjoyment...

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The Revolutionary Fisher CameraCorder™ is engineered by SANYO, one of the world's foremost digital imaging R & D sources.

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THE DELL XPS GAMING PCs. POWER AT A PRICE THAT FIRES YOU UP EVEN BEFORE YOU REDUCE ENEMIES TO ASHES.

Inspiron XPS Notebook shown with Skullz design option.

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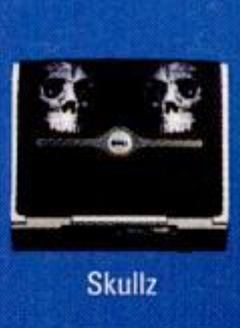

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Head2Head

A showdown among natural PC competitors

THIS MONTH: Mobile Gaming Devices!

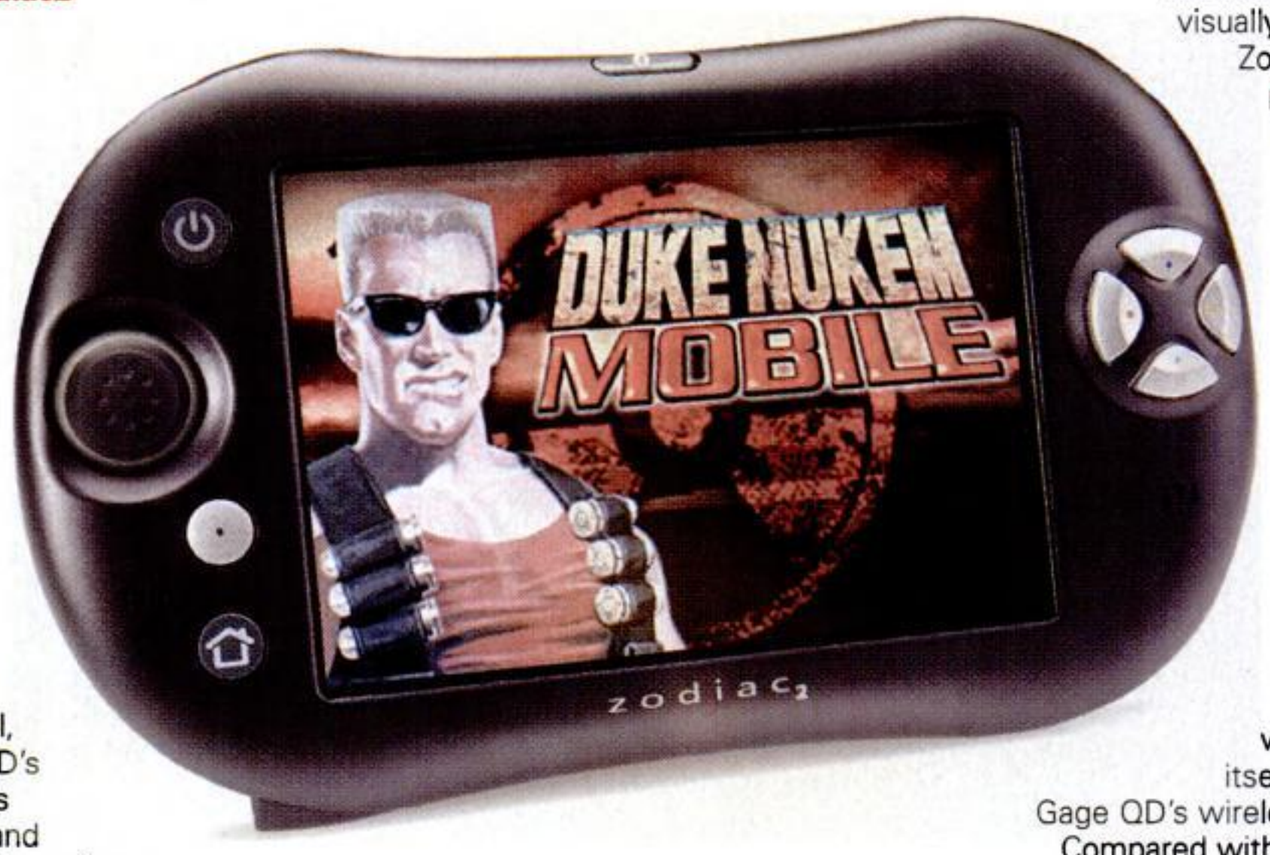
It's ironic that even though we live in a fast-paced society, waiting remains an unavoidable fact of life. Whether it's at the post office, the bank, or the DMV, there will always come a time when you're stuck in line staring at the back of some stranger's head watching precious seconds of your life slip slowly down the drain. This is why we never leave the house without taking along some sort of gadget to keep us entertained; playing a few rounds of virtual golf or listening to MP3s makes the down time pass that much faster. This month, we test two portable devices that will help you retain your sanity when life inevitably grinds to a halt: the Palm OS powered Tapwave Zodiac2 and the Nokia N-Gage QD. Which device, if any, should you slip into your pocket before venturing out into the vast, unforgiving world? Read on to find out.

—TAE K. KIM

TAPWAVE ZODIAC2

Productivity: There's no contest here. The venerable Palm operating system has powered handhelds and PDAs for a long time and the number of available applications is staggering—you can find software that will help you stay on top of everything from your finances to your daily calendar. There's even software available to help keep your fantasy football team in check. Can the N-Gage QD do that? Nope. **Winner: Zodiac2**

Unproductivity: This is one category where the Palm OS' pre-existing library of software doesn't help the Zodiac2. Traditionally, PDAs and handhelds weren't intended as gaming machines, so the majority of available Palm OS games are simplistic time wasters that are no more challenging than the games that come preinstalled with Windows. The Zodiac2 does sport a few first-rate titles, including a port of id's *Doom 2* that plays like a carbon copy of the original, but when compared with the QD's impressive line-up, the Zodiac2's game library lacks both variety and originality. Need further proof? According to Tapwave's web site, the number-one selling Zodiac2 game is *Duke Nukem Mobile*. Yikes. **Winner: N-Gage QD**



Input: The Zodiac2's gorgeous screen is more than just a pretty face; it also functions as a touch screen. You can use the included stylus to tap onscreen icons and enter text via the Graffiti handwriting-recognition software. The Zodiac2 also features a button layout that will feel immediately familiar to any gamer who's spent time holding a Gameboy Advance or PlayStation 2 controller. Unfortunately, we were less than pleased with the Zodiac2's slim formfactor; extended gaming sessions became a finger-cramping ordeal as we struggled to find a comfortable grip. Regardless, while the N-Gage QD's taco shaped body is much easier to hold, the Zodiac2's versatile touch screen and intuitive button layout give it the edge in this category. **Winner: Zodiac2**

Output: "Wow!" was the first thing we said when we saw the Tapwave's gorgeous display: We definitely weren't expecting it to look this good. The 3.8-inch backlit display is powered by ATI's Imageon hardware and offers up a resolution of 480x320 and 16-bit color support. Everything from games to mundane tasks like managing our social calendar became a visually satisfying experience thanks to the Zodiac2's bright, crisp display. The only problem: The reflective nature of the screen made for some occasionally nasty background glare. But this is a minor complaint about what is arguably the Zodiac2's best feature. Wow, indeed. **Winner: Zodiac2**

Connectivity: Aside from Bluetooth support and a USB cable for wired syncing, the Zodiac2 offers little by way of connectivity options. We would have appreciated a Zodiac2-compatible Wi-Fi solution but none were available at the time of this writing. It's possible one will present itself in the future but until then, the N-Gage QD's wireless nature easily wins this category. Compared with the Zodiac2, it's practically bristling with options. **Winner: N-Gage QD**

MAXIMUM PC VERDICT 7

+ RIDING THE WAVE

Beautiful screen, Palm functionality, and a great library of apps.

– DOING THE WAVE

Not-so-great library of games, and a lack of connectivity options.

$400, www.tapwave.com

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NOKIA N-GAGE QD

Productivity: While the N-Gage QD is great for gaming, it doesn't really offer much to encourage productivity, aside from making phone calls. It features a few built-in utilities, such as a calendar for keeping track of daily events, but it's nothing you can't find on the average cellphone. To be fair, Nokia isn't trying to position the QD as a productivity tool, and the software library reflects this: Almost all of the available titles are entertainment oriented. Still, it would have been nice if we could do more with the N-Gage than make phone calls and blast aliens. **Winner: Zodiac2**

Unproductivity: The N-Gage QD scores a significant victory over the Zodiac2 with a large library of entertaining titles from established developers, EA and Activision being the two most prominent companies to throw their hats into the N-Gage ring. Big-name (and vastly more entertaining) franchises such as *Tony Hawk's Pro Skater*, *The Sims*, and *Tom Clancy's Splinter Cell* are available, and a quick look at the upcoming release roster reveals more grade-A titles on the way. **Winner: N-Gage QD**

Input: Because it doubles as a cellphone, inputting information into the QD is a slow and methodical process that requires multiple button presses just to enter someone's name. Anyone who's become adept at typing text messages on a cellphone will feel right at home, but the process is constrictive and time consuming. We also felt that the face buttons were grouped too closely together, making it far too easy to press the wrong one during intense gaming or frenetic data entry. And forget about playing games on the QD that require sophisticated controls—its button layout is far too limited for anything that requires more than a few simple presses. **Winner: Zodiac2**

Output: When we first saw the N-Gage QD's miniscule screen, we blanched. Surely, Nokia didn't expect us to play games on that! True to the N-Gage's cellphone roots, the screen looks like a beefed-up cellular display and its specs concur—the QD features a maximum resolution of just 176x208 and supports only 4,096 colors, which pales in comparison to the Zodiac2. The limited resolution and color support is noticeable in most games; blocky textures and washed-out colors dominated our experience. But despite these limitations, the QD does an admirable job of delivering eye candy. Unfortunately, when compared with the Zodiac2's screen, this eye candy isn't all that sweet. **Features: Zodiac2**

Connectivity: While the QD's cellphone roots hurt it in other categories, they pay off here. The cellphone portion of the QD is strong thanks to the T-Mobile service that powered our review unit. The QD also offers N-Gage Arena as icing on the cake: It's a service that lets you download exclusive content and connect and compete with other N-Gage owners in a variety of games. Connecting to the service is almost idiot proof and takes just a few button presses. What's more, the QD matches the Zodiac2 by offering Bluetooth support. It's no joke: The QD is more connected than a Hollywood agent. **Winner: N-Gage QD**

MAXIMUM PC VERDICT 7

+ ENGAGED

Strong game library, easy connectivity, and integrated cellphone.

− DIVORCED

Limited features, small screen, and cramped button layout.

$180 w/out phone contract, www.n-gage.com

THE UPSHOT

While the Zodiac2 scored more wins in the individual categories, we're going to give the victory to the **N-Gage QD** for one simple reason: It has a much better library of games. The Zodiac2 dazzled us with its gorgeous screen and intuitive button layout, but what's the point of having great hardware if you're lacking the software to take advantage of it? The N-Gage QD's miniscule screen and limited input options may pale in comparison but its rapidly growing stable of first-rate titles and seamlessly integrated multiplayer options make it the superior device for gaming on the go.

Still, despite its victory over the Zodiac2, the N-Gage QD isn't ready to be crowned the king of the portable gaming mountain—that distinction still belongs to the Gameboy Advance. While both the Zodiac2 and the N-Gage QD offer features that the GBA can't match, Nintendo's portable still remains the best option for mobile gaming thanks to its impressive library of titles and affordable price. For our money, we'll continue to carry our GBA for gaming and a separate PDA and cell phone for everything else. This requires us to lug around more than one device, but that's a sacrifice we're willing to make. ■

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WatchDog

Say hello to Axl Huckleberry, WatchDog of the Month.

Maximum PC takes a bite out of bad gear

THIS MONTH: The WatchDog goes after...

>Microsoft >PayPal >Super MP3 Recorder/ SWReg.org

Who Is the Boss of Your OS?

DEAR DOG: This happened a few years ago but I imagine it's still a problem for some users today. After purchasing a low-end Micron system, the motherboard expired one week after the warranty did. I replaced the motherboard for $50 (who needs that $100-$200 extended warranty?) and all was fine for another six months.

One day I decided I needed a fresh install of the operating system, so I backed up my data files and wiped the drive. When I tried to install the OS using the CD that came with the Micron PC, I got a message informing me that this was not the original computer and therefore the OS would not install. I e-mailed Micron for support and the reply was short and to the point: "Go buy the operating system." I tried fishing around Microsoft's web site for some support but found none.

Was there something in that license agreement stating that the OS was only good for the life of the original components? Is there a legal way around this or some other recourse?

—JON SHELDON

THE DOG RESPONDS: Unfortunately, it's all a mess, Jon. Here's how it breaks down: When Microsoft sells its operating systems, there are several different levels of licenses. The most common to the average consumer is the retail version of the OS that you buy at CompUSA or Best Buy. These boxed versions come on hologram CDs and once purchased, can be installed on any machine of your choice (so long as its not multiple machines).

Most power users, however, are familiar with the "OEM versions" you can buy at your local computer shop or swap meet. These usually consist of a hologram CD, a thin pamphlet, and a certificate of authenticity, or COA.

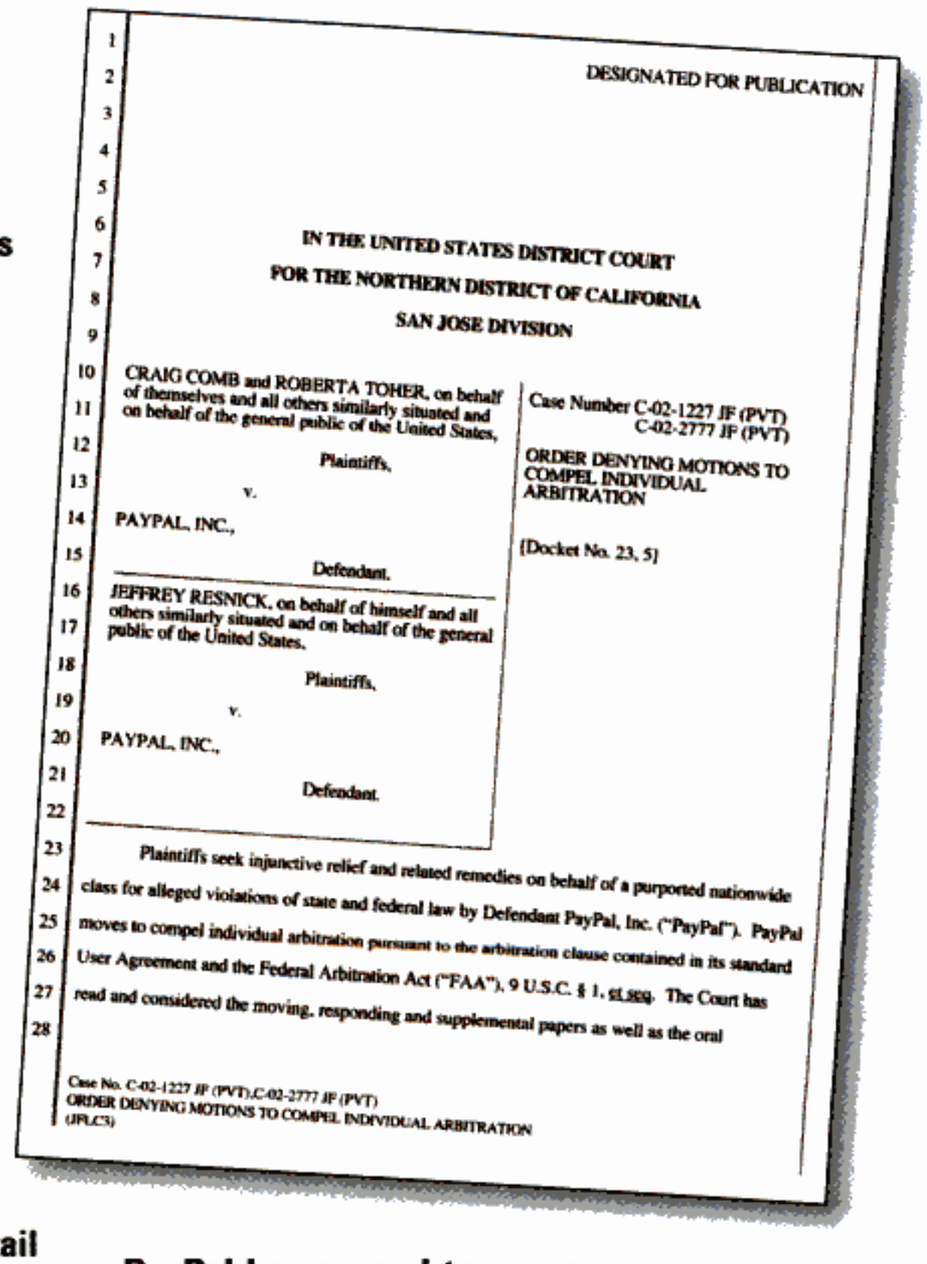
A third type of Windows CD that consumers may see is the direct OEM discs. These CDs come from high-volume PC makers like Micron, Dell, and Hewlett-Packard that have deals with Microsoft, so they don't have to include the hologram CD. They're usually just silk-screened CDs or DVDs with the company's name on it. These discs usually include a restore image, and in the past, they've also included a full version of the OS.

While the retail and generic OEM discs let you install the OS on any system, the direct OEM discs usually contain safeguards that prevent you from installing the OS onto a motherboard that doesn't identify itself as being from the company. In your case, you likely had a direct OEM CD that was keyed to a DMI string in the motherboard. In other words, you're screwed.

If this makes it sound like it's better to buy from the little guys who include the actual Windows XP hologram disc with their systems, think again. That OS is still technically tied to the OEM hardware, not the end user. Microsoft enforces compliance with the big PC makers by requiring the OS to check the motherboard ID before installing it (Microsoft considers a motherboard the very heart of a PC). With the small PC makers, Microsoft can do the same by refusing to reactivate the OS if the motherboard is different than the original. The reason for all of this is cost, of course. PC manufactures of all sizes get price breaks from Microsoft. While a retail version of XP Pro costs $200, the generic OEM version costs just $90.

According to the advice offered on Microsoft's bulletin board: "Generally, you may upgrade or replace all of the hardware components on your customer's computer and the customer may maintain the license for the original Microsoft OEM operating system software, with the exception of an upgrade or replacement of the motherboard. If the motherboard is replaced, then a new computer has been created and the license of a new operating system software is required. Once the motherboard has been replaced, you are not authorized to reinstall the OEM Microsoft software that was originally preinstalled on the computer system."

Not all hope is lost for hobbyists who enjoy replacing motherboards every year. From what the Dog knows, Microsoft rarely enforces its nonreactivation policy. So your odds are better if you have a generic OEM copy of the OS as opposed to a direct OEM disc from a large company such as Dell or Micron. But if you're really worried about being cut off at the knees when you upgrade your system, we recommend you buy the retail version, or switch to Linux. Woof.



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IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE DIVISION

CRAIG COMB and ROBERTA TOHER, on behalf of themselves and all others similarly situated and on behalf of the general public of the United States,
Plaintiffs,
v.
PAYPAL, INC.,
Defendant.

Case Number C-02-1227 JF (PVT)
C-02-2777 JF (PVT)

ORDER DENYING MOTIONS TO COMPEL INDIVIDUAL ARBITRATION

[Docket No. 23, 5]

JEFFREY RESNICK, on behalf of himself and all others similarly situated and on behalf of the general public of the United States,
Plaintiffs,
v.
PAYPAL, INC.,
Defendant.

Plaintiffs seek injunctive relief and related remedies on behalf of a purported nationwide class for alleged violations of state and federal law by Defendant PayPal, Inc. ("PayPal"). PayPal moves to compel individual arbitration pursuant to the arbitration clause contained in its standard User Agreement and the Federal Arbitration Act ("FAA"), 9 U.S.C. § 1, et seq. The Court has read and considered the moving, responding and supplemental papers as well as the oral

Case No. C-02-1227 JF (PVT),C-02-2777 JF (PVT)
ORDER DENYING MOTIONS TO COMPEL INDIVIDUAL ARBITRATION
(JFLC3)

PayPal has agreed to pay consumers who had their accounts frozen by the company.

PayPal Settles with Consumers

DEAR DOG: I just received an e-mail from paypal@settlement.com telling me I'm eligible for a settlement from PayPal. But the e-mail wants me to venture to a non-PayPal site to make a claim. I'm a little leery about this. Is it a scam?

I've heard about scams targeted at PayPal users in order to get user names, passwords, and such. I know this e-mail looks legit, but in my mind, anybody can produce an e-mail like this one.

—MIKE SWANSON

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Super MP3 Recorder: Good software but not such good service.

THE DOG RESPONDS: You can never be too paranoid when it comes to providing your password or other sensitive information. In this case, though, the e-mail is legitimate.

PayPal has agreed to settle two class-action lawsuits filed in 2002. The company allegedly violated the federal Electronic Fund Transfer Act by not providing fund statements in a timely manner as the law dictates, and inappropriately froze its customers' accounts for days or weeks at a time when cases of fraud were alleged. The latter prevented consumers from accessing funds that weren't even in dispute. Yet, as one of the suits alleged, PayPal kept the accounts open for deposits so it could continue to "derive economic benefit from the deposits while preventing the customers from accessing even undisputed funds while the investigation was pending."

The suits also allege generally poor customer service: "Plaintiffs further allege that PayPal does not provide a toll-free customer service telephone number, does not effectively publish the customer service telephone number it does provide, requires customers to report erroneous transactions by e-mail while not providing a specific e-mail address for that purpose, requires customers to provide numerous and burdensome personal documents before it undertakes an investigation, responds to e-mail inquiries with form letters, refuses to provide details or explanations with respect to its investigations, and provides no procedure by which a customer can appeal the results of an investigation. Plaintiffs also allege that when customers are able to contact PayPal representatives, the representatives are combative and rude, refuse to answer specific questions, hang up in the middle of phone calls, provide 'canned' responses to individualized problems, require customers to fax information while providing inoperative fax numbers, and refuse to allow customers to speak to managers."

One plaintiff in the original suit said that after two separate payments were withdrawn from his PayPal account without his permission, it took three days to finally contact PayPal, and another seven days for the cash to be refunded. Furthermore, the consumer was charged $208.50 by his bank because the missing funds lowered his account balance below the minimum required. When the consumer asked PayPal to cover the bank charge, PayPal balked.

Without admitting any wrong doing, PayPal has agreed to pay $9.25 million to people who had their accounts frozen. Consumers who opened accounts between October 1, 1999 and January 31, 2004, and who can prove their accounts were frozen or limited during the period are eligible for a $50 settlement. Consumers who can prove that a frozen PayPal account injured their business and cost them more than $50 are eligible for more provided they can show the damage. PayPal has set aside $1 million for such claims.

The deadline to file a claim form is October 23, 2004. Paper forms must be postmarked by November 1, 2004. For more information on the settlement, visit: www.paypal.com/settlement or www.settlement4onlinepayments.com.

Not So Super MP3 Recorder

DEAR DOG: I ordered the application Super MP3 Recorder from **SuperMP3Recorder.com** on June 2, and when I ordered it I plainly stated that I would not buy it if I could not get a physical disc. I was told I could. After giving my credit card info I was sent a download link. I e-mailed the company reiterating that I did not want a download. After a week, I got a response telling me I did not pay for the disc. I sent an e-mail stating how much more I was willing to pay for the disc. I received no response. Finally, out of disgust at the lack of any customer service, I sent an e-mail canceling my order. I have sent a total of six e-mails, all saved on my computer, and so far have received no response.

The download link was sent via **SWReg.org**. I have given them almost two weeks to remove the charge from my card and I have heard nothing from either Super MP3 Recorder or SWReg. Can you help me?

— BILL WATSON

THE DOG RESPONDS: After repeated attempts to contact SuperMP3Recorder.com, the Dog was unable to get a response beyond the standard canned e-mail. Likewise, SWReg.org, which handles billing for the company and several other shareware programs, doesn't like to share its e-mail address. So the Dog advises you to call your credit card company to dispute the charge. And don't worry about being blacklisted by SWreg. Because SWReg didn't respond to your e-mails, you probably don't want to do future business with the company or the companies it represents. In fact, the Dog thinks all *Maximum PC* readers should avoid these two web sites until they clean up their acts. ■

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing **watchdog@maximumpc.com**. The Dog promises to get to as many letters as possible, but only has four paws to work with.

"I turn dot.coms into money."

—Justan Brandt
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Everything We Know About

Let's get this out of the way right up front: The next version of Windows—code-named Longhorn—isn't expected to ship until sometime in 2006.

So why are we previewing it so early? And why should you care?

The answer is simple: Microsoft's top-secret sequel to Windows XP promises the most significant technological leap forward in the almost 20-year history of the venerable OS. When it's finally launched, Longhorn will be the most demanding operating system Microsoft has ever released. The new 3D user interface will even require a DirectX 9-compliant videocard!

In addition, the next version of Windows will feature a brand-new file system, some innovative new networking options, and will likely integrate digital rights management technologies from the BIOS level on up.

It's clear that Longhorn—like every prior major revision of Windows—is a make-or-break OS for Microsoft. As such, everyone wants to know what it looks like and how it works. To find out, we scoured newsgroups, dug deep into Microsoft's developer web sites, read everything we could find about Longhorn, and then tested the hell out of an early alpha of the OS. Over the next eight pages, we're going to tell you everything we learned. And because Microsoft has remained steadfastly mum about the 3D interface, we consulted experts in the field for their predictions regarding Microsoft's new take on the GUI.

As we delved into the details, we had a thought: Why should we have to wait until 2006 to get all this new functionality? So we integrated all of the best user interface improvements we've seen in Longhorn into Windows XP. The result is an OS modification you can perform yourself that will make your version of Windows look—and behave—like early versions of Longhorn.

Will the general public upgrade their PCs and make the move to Longhorn en masse despite the demanding system requirements and DRM foibles? Or will they instead stick with WinXP? Maybe PC users will take another path altogether and move to Linux or Mac? Turn the page to get your Longhorn on, then chime in on whether or not you plan to make the Longhorn leap by e-mailing us at **input@maximumpc.com.**

—BY WILL SMITH, JOSH NOREM, AND JASON COMPTON

WINDOWS LONGHORN

Microsoft's sequel to Windows XP could be the most revolutionary OS yet. Maximum PC investigates Longhorn's 5 most significant innovations

Turn WinXP into Longhorn

WINDOWS LONGHORN

Say goodbye to the old, flat Alt-Tab experience. The new 3D task switcher lets you see the contents of your windows while you flip between them.

To date, we know of five major changes to Longhorn: a new, improved 3D user interface, a new database-like file system, features that will make gaming more accessible and convenient, revamped digital rights management (DRM), and a recently announced "Castle" feature, which is an interesting and easy new way to share user profiles and data across small home networks. All this new technology makes Longhorn the biggest operating system upgrade since Windows 2000. Let's start with the 3D user interface.

Introducing Avalon

Longhorn's 3D graphical user interface, code-named Avalon, could revolutionize the way you access your PC. As you might imagine, Microsoft has kept the details regarding Avalon under tight security (to read about how it *might* look, turn to page 34), but we know this much: Avalon isn't just a 3D GUI for Windows. It's actually a whole new way to draw user interfaces for applications—in 3D *and* 2D.

Currently, programmers of non-Avalon Windows applications create their interfaces using a special program called a form designer. Using this form designer, every single button and field is associated with a function in the program. Then the form is saved as part of the application. In WinXP 3D content drawn by a Direct3D-compatible 3D accelerator requires a totally different set of programming rules, so programmers have thus far been unable to add 3D effects and elements to a 2D user interface.

With Avalon, user interfaces (and even some simple programs) will be written using a new language called XAML—extensible application markup language. This means that instead of using an esoteric program designed specifically to create user interfaces, developers will be able to write and edit XAML files with a simple text editor. Even cooler, the Avalon XAML

Goodbye Direct3D—Hello Windows Graphics Foundation!

Because Longhorn throws out the old-fashioned 2D Windows Desktop in favor of a new, 3D-rendered Desktop (every Window will literally be a 3D object!), it's crucial that Windows' 3D-rendering pipeline be rock solid.

This is where the Windows Graphics Foundation comes in. In some ways, WGF is nothing more than the next version of Direct3D, but it sports a lot more functionality than earlier, gaming-oriented versions of Direct3D. No longer is speed the primary concern; with WGF, reliability and stability are vital.

Until 2002, most graphics processors were designed with a singular task in mind: running games as quickly as possible. Multitasking, recovering from crashes, and being a responsible Windows citizen were minor concerns compared with the almighty frames-per-second. But because the 3D-rendering pipeline is going to be responsible for the brunt of Windows' force, it must be subtly reshaped now—before Longhorn ships in 2006. In particular, there are two new improvements to the graphics pipeline that Microsoft must perfect if WGF is to be ready on time.

First, the driver and graphics card must work together to provide seamless fault recovery. If the video driver crashes, it needs to restart and resume operation without missing a beat. Similarly, if a 3D application crashes, Windows needs to be able to recover and quickly resume operation. Forcing the user to restart Windows because of a graphics crash is not an acceptable solution, as people familiar with Windows 3.1 and Windows 95 can attest.

Second, the GPU needs to be accessible to multiple apps. There needs to be a way for the OS to schedule batch processing on the GPU. Ideally, the OS will be able to add graphics tasks to a queue, and possess the flexibility to preempt less important tasks (like re-rendering a background window) for more important tasks (like redrawing the foreground window) whenever necessary.

WGF 1.0 should also give game developers new levels of flexibility such as we've come to expect from major new revisions of Direct3D.

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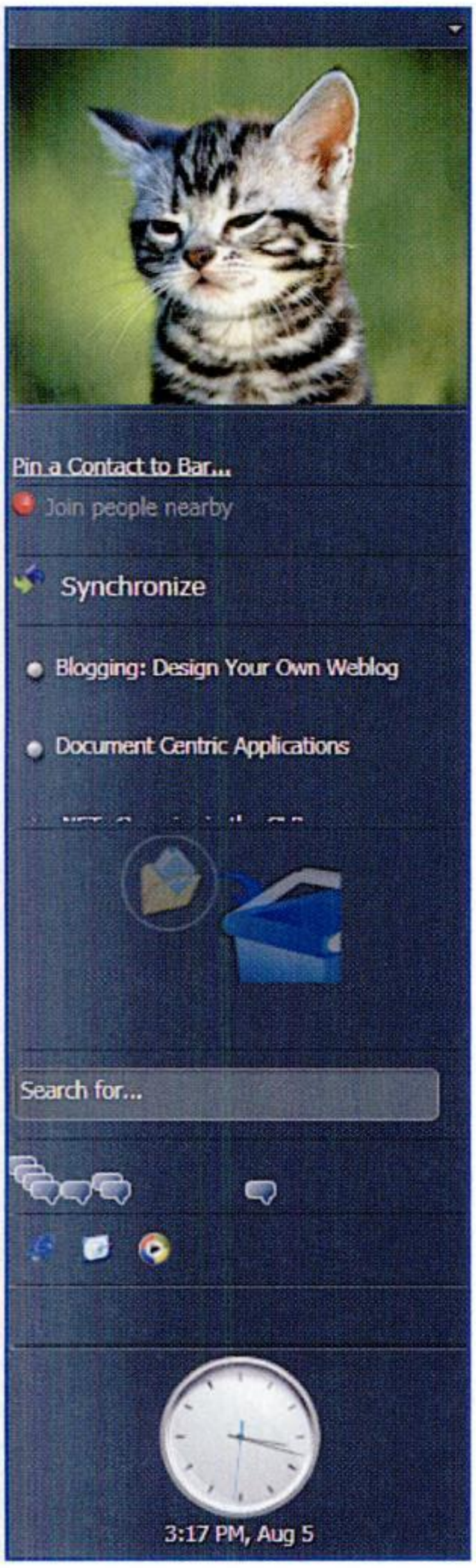

The most obvious change to Longhorn's UI is the Sidebar. Think of it as a system tray on steroids. It adds all sorts of nifty features, like an integrated RSS feed reader!

code can describe and enact both 2D elements and 3D elements at the same time.

One of the really handy side benefits of using XAML for application interfaces is that programmers can embed the actual code a program needs into the XAML file itself. Therefore, anyone with a text editor, like *Notepad*, can write programs—complete with a flashy user interface—using any language that Longhorn supports, without the need for an expensive software development package like *Visual Studio*. Nifty, eh?

We've yet to see any user interface designs from Microsoft that benefit from a blend of 2D and 3D rendering, but the Alt-Tab interface pictured on the previous page makes us feel optimistic. It remains to be seen how Microsoft will integrate the Avalon functionality into the main OS.

WinFS: Find Your Files Fast

You type a phrase into Google, press Enter, and the answer to your query pops up in less than half a second. It begs the question: If Google can search thousands of terabytes of data on the entire Internet so quickly, why does it take 20 minutes for Windows to search the files stored on your hard drive? The short answer is that Google searches through well-ordered databases to find an answer, and Windows has to search through each individual file. WinFS—Longhorn's brand-new filing system—will bring the raw speed and convenience of database searches to Windows.

How does it work? A database file system is a pretty simple concept, and has been tried before (the first OS we tested with a database-driven file system was BeOS in 1999). In Microsoft's implementation, a next-gen SQL server layers on top of a NTFS disk. When you save a file to certain directories—any folder in the My Documents tree would be fair game, but beyond that the files that will be part of WinFS are unknown—the OS will automatically index its contents and save it to the database.

How does this benefit the end user? Right now, if you want to find an *Outlook* contact, you have to open *Outlook* and use the built-in search function. With WinFS, you'll be able to open a Windows search dialog and simply type in the contact's name. Even better, not only will you find the contact, but you'll also find all the relevant e-mails, any *Word* documents and *Excel* spreadsheets that include the contact's name, and any digital photos bearing that name in the metadata—all in a fraction of a second. Such is the power of WinFS.

Get the Newbies Gaming

According to Microsoft, one of the primary goals of Longhorn is to make PC gaming more accessible to the masses. While *Maximum PC* readers have no problem getting their game on (hopefully), playing games in Windows requires more understanding than, say, playing on a console. The Longhorn team aims to change this by stealing the best things about console gaming and integrating them into the Windows OS.

The central improvement is a My Games-type of gaming portal, which will grant access to every installed game from one handy spot. The games portal, which is still unnamed, sits in the Start menu. When you click the Games icon you'll see a list of every game on your system. Clicking a game will give you access to your save files, any available patches, and even metadata about the game, such as the publisher's web site and the game's ESRB rating. Heck, Microsoft is even setting up a Windows Update-style repository for all patches and game updates, which will conveniently download the latest fixes for all your games when your system is idle.

Longhorn will also let parents limit the games their children can play, either by rating or on a game-by-game basis. For instance, you can specify which accounts have permission to play which games using the Games interface when you're logged in as an Administrator. Prohibited games are blocked at the file system level on a user-by-user basis. Not only will the shortcuts to the games be removed from little Timmy's menus, he won't even be able to see their directories!

The new games interface gives you access to every game installed on your system at once. You can see whether there are patches to download, the rating of each game, and even manage your saved games.

'Improving' Digital Rights Management

High on our Longhorn watch list is Microsoft's enhanced and comprehensive-sounding DRM technology, which is rumored to unite software-based digital rights management with lockouts at the hardware level. The new technology—formerly code-named Palladium and now called the Next-Generation Secure Computing Base for Windows—prom-

Continued on page 35 →

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WINDOWS LONGHORN

How Will Longhorn's 3D Interface Work?

How does any 3D interface work, for that matter? We take a look at 6 early experiments by Sun and Microsoft that represent the beginning of a new breed of graphical user interfaces

Apple has been dabbling in simulated 3D desktop coochie-coo ever since the introduction of OS X, but to date the company's implementation hasn't extended beyond mere window dressing. Right now, the most encouraging projects in 3D-aware desktops are Microsoft's Avalon interface for the Longhorn operating system, and Sun's Looking Glass, an interface layer for Linux and Solaris machines that can be pounded into Windows with the right rubber mallet. We take an early look at each in order to gain some insight into how the introduction of the third dimension can and will affect our computing experience at the OS level.

Improved Alt-Tab selectors

One thing Sun and Microsoft agree on is that we need a better way of selecting and moving between multiple open windows. Both Avalon and Looking Glass have their own versions of an Alt-Tab selector that displays a cascading, angled view of the available windows and provides much more information than a brief icon list can. Using this display method allows Windows to reside in the background yet remain "glanceable." Today's 3D hardware makes such tricks a snap. "[Microsoft] is finally rendering the OS and all the windows on the hardware [GPU], and I think that's phenomenal, and about time," says Robert McLaws, operator of LonghornBlogs.com.

Using the backs and sides of open windows

One of Sun's most striking usages of 3D in Looking Glass involves the designers' attempts to stretch the boundaries of usable space within the OS. Two concepts are being explored: providing a "sticky pad" for notes and/or application details, and displaying user preferences on the back or side of each open window. Rather than opening a new preferences window, users can "flip" the window around, make changes and adjustments, and then flip it back with the touch of the mouse or keyboard. In a 3D environment, windows will have more surface area so information such as a file name or processing status could even be stored on the "side." Ideally, this would even apply to existing applications that haven't been recoded.

Dynamic wallpaper

It's subtle, but significant. Looking Glass has already done away with static desktop wallpaper, allowing a series of images, and even panoramas, to be loaded and panned through with mouse clicks. Upload a panorama of the Piazza San Marco in Venice and you could be working right in the center of it—without being hassled by tourists and pigeons. This feature is, of course, largely decorative, but it does suggest possibilities for the future—you could be surrounded by a 360 degree virtual desktop with pictures of loved ones, open documents, and a live video feed of your cat, for example.

Functional special effects

Microsoft has demonstrated loads of fancy effects being considered for implementation in Longhorn, but it's still unknown exactly what Avalon is expected to do. We know you'll probably be able to manipulate application windows in a 3D space, possibly pivoting them at will in any direction. We also know you'll probably be able to introduce all kinds of wacky environmental effects into this 3D space, from windows that flutter in the breeze (calling the users' attention, perhaps, to an application error) or even disappear behind a thick fog.

"They're trying to make it smoother. Things don't just disappear, they fade in, and they will be real objects on the desktop that you can move around," says Adam Kinney, an online community manager for Xamlon, a developer of Longhorn-specific applications. When *Maximum PC* interviewed Kinney, he told us that his most recent Longhorn build (subject to change, of course) introduced new documents half-tilted into the background that turned to gradually settle into a standard viewing perspective.

Angling windows in a 3D space is an improvement over minimizing them; the window takes up less space, but you can still see what's on it.

Vector-based graphics

The Longhorn desktop will be vector-based rather than bitmap-based, meaning that as resolution and zoom increase, everything will look just as good, not blocky and aliased. The vector approach will also allow the creation of far slicker program interfaces, because a vector drawing will be easily exportable to a Longhorn-specific program. "Today, a graphic designer goes into *Illustrator* or *Photoshop*, [draws an

Mac Designer Says: Death to the GUI!

All this talk about introducing 3D into Windows and Linux horrifies Jef Raskin. Designer of the original Macintosh, Raskin wants to do away with the iconic (figuratively and literally) personal computer GUI that dates back to the very computer he helped create. "I think windows were basically a mistake. It looks slick and seemed neat, but now it's a nuisance."

His new concept, The Humane Environment (THE), eliminates most of the graphical trappings of two decades of GUI theory in favor of moving through a 3D landscape that represents a user's file system. Filenames would be largely eschewed in favor of database-driven searches ("Do you have to remember a URL to find something? Google indexes every word in everything!" he says.) His vision is unlikely to cause reverberations at Microsoft, Apple, or the KDE and GNOME interface teams any time soon, but Raskin says he's hopeful the concepts will soon appear in wearable computing devices. For more information, browse to humane.sourceforge.net.

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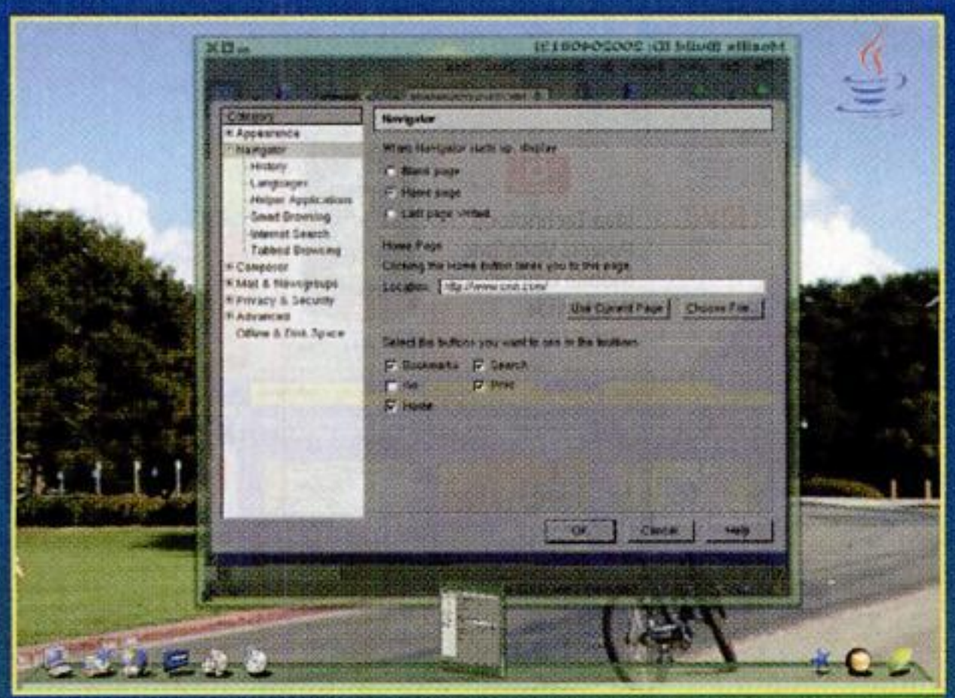
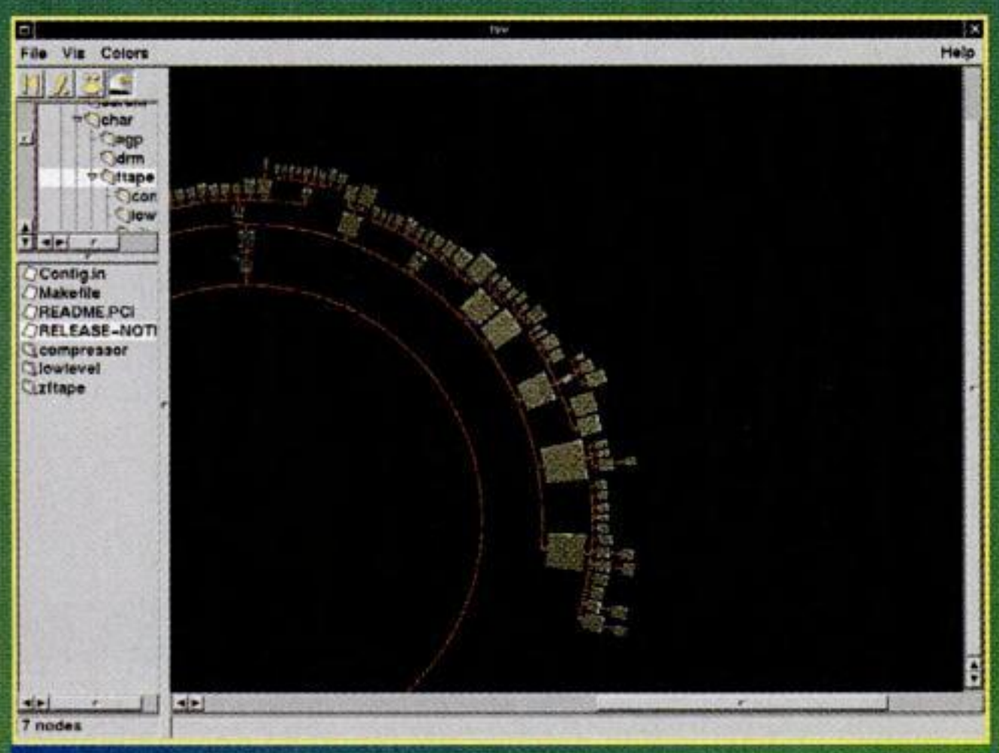


Looking Glass is toying with putting application preferences on the flipside of a window as displayed here. The result: easy access and considerably less screen clutter.

interface,] prints it out, and a [programmer] has to take that image and try to make it work," says Kinney. The key to bridging the gap between concept and execution is extensible application markup language (XAML), a new method of describing GUI creation that will save programmers from having to hack elegant designs into rigid, resolution-specific code.

Re-learning not required

Although the changes will be significant, don't worry—the next iteration of your operating system won't demand head-mounted displays or radical new file system metaphors. The development of the 3D interface "isn't going to turn on a dime," says Juan Carlos Soto, director of Sun's software technology office. Sun's Looking Glass, for example, is being developed so all its features work with a standard two-button mouse and keyboard. Nor is there any reason to fear a radical new paradigm in file organization. "People think they're going to see a [fully] 3D desktop," says McLaws. "They expect to have icons stacked deep into infinity and to reach out with a hand and grab something off the shelf, and that's not necessarily the case."



Like *SpaceMonger* on steroids, *File System Visualizer* for Linux (available now) gives you a 3D perspective of your entire hard drive. It's a beautiful fly-over at night.

Continued from page 33

ises to protect user data (your e-mail), corporate data (your company's files), and commercial data (digital music you downloaded from a publisher) from the hardware level up, giving only trusted hardware and software access to such data.

Yeah. Go back and reread that last sentence. Note that there's no mention of a "trusted user." This could mean that if a content provider who you purchase protected music files from dictates that your hardware MP3 player isn't "trusted," you won't be able to play those files on that MP3 player. Furthermore, because the DRM status of your players and files can be updated whenever you connect to the Internet, a player that's trusted today could become untrustworthy tomorrow. And trusted hardware isn't limited to MP3 and video players—it could also include optical drives and hard drives.

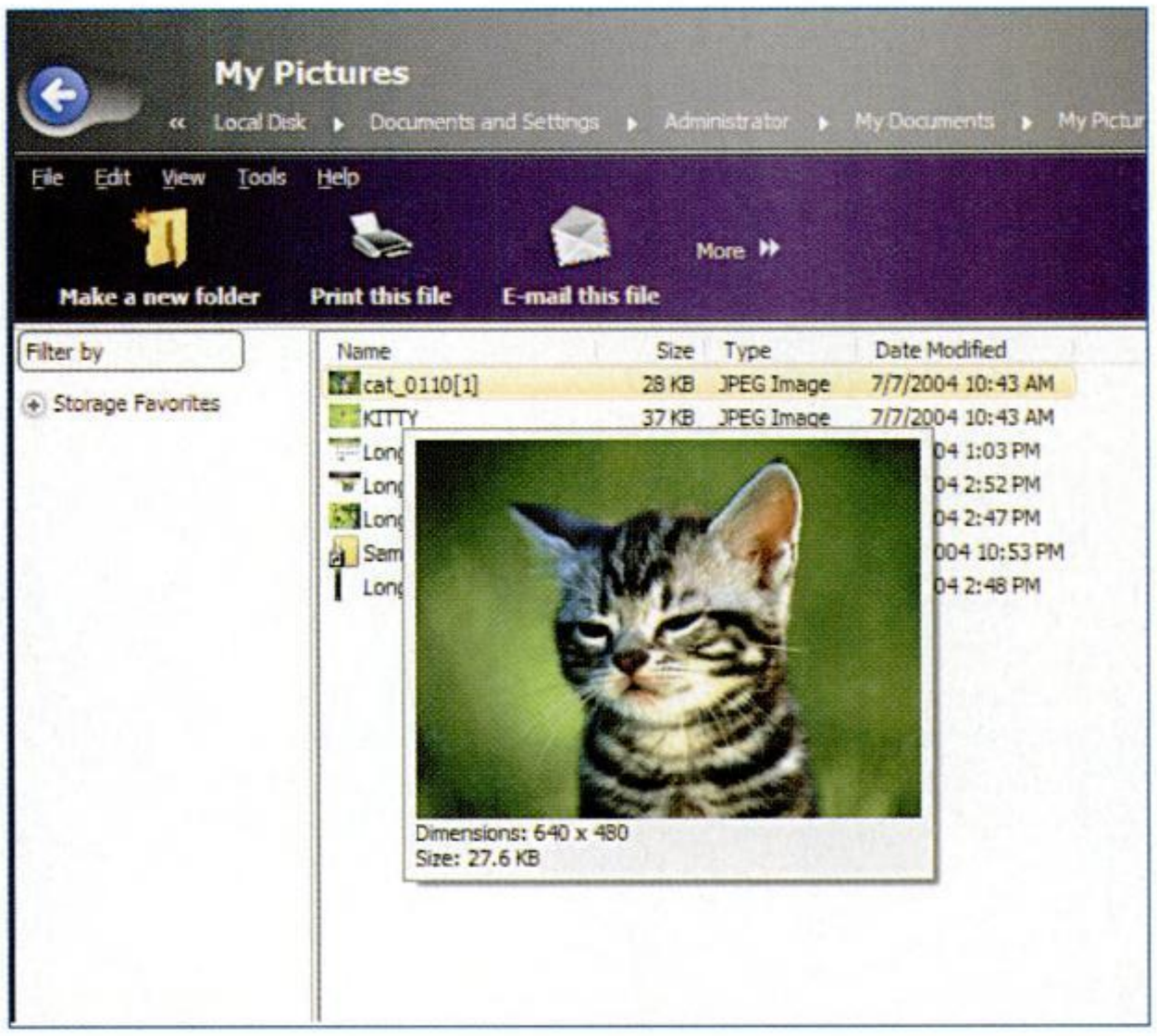
It's not all doom and gloom, however. Microsoft has pledged that Palladium will be an opt-in system, and that PCs will ship with Palladium disabled at both the hardware and software levels.

Without technology like Palladium, it's unlikely that content providers will ever allow high-quality audio and video to legally reside on your PC. Thus we foresee Palladium being a mandatory requirement if you want to install, say, an HDTV tuner or DVD-Audio player in the new version of Windows.

The Castle: Home Networking Taken to the Next Level

Even if you don't know it, there's a pretty good chance your office uses roving Windows profiles. No matter where you are in your office, you can sit down at a free computer, log in, and access the same Windows Desktop, e-mail, and installed applications that you do everywhere else. Unfortunately, unless you want to endure the hassle of setting up a Windows server and domain, there's no easy way to replicate this functionality for home users. This is why we're so excited about Longhorn's Castle feature—it allows multi-PC homes all the benefits of

Continued on next page ➔



Longhorn also includes context-sensitive popups for many types of documents! Images, text documents, and even music files have special, easy-to-read popups that inform you of the files' contents without having to open it.

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Maximum PC's Longhorn Edicts

The editors ring in with their must-have features for the next version of Windows

George Jones: I feel like the power-conservation features of Windows just don't work the way they should. Clicking the hibernate button is a sure-fire way to bomb out my machine, and that's just not acceptable. Furthermore, I'm sick of seeing the crappy three-year old nVidia drivers every time I log in to Windows Update. I want to see the latest—too hot for *Doom 3*—Detonator drivers!

Katherine Stevenson: One thing that Longhorn must fix is its terrible Wi-Fi support. I'm sick of my wireless network connection dropping out all the time for no apparent reason.

Will Smith: Finding and installing new applications is ludicrously easy on most Linux distros these days. Microsoft needs to make finding new apps and loading them on a PC as easy as *emerge* does on Gentoo or *apt-get* does on Debian. I'm sick of the Installshield installer.

Also, many people who've been running Windows for a year or two have dozens of apps running in their system trays. I want Microsoft to acknowledge that the craplets that every company feels is necessary to install are a problem, and give normal users an easy way to get rid of them forever.

Gordon Ung: I'd like to see Longhorn finally support the auto-rotation flag in JPEGs so all the pictures from my digital camera don't have to be manually rotated. While you're at it, how about fixing the mixer so you don't get blasted out of your chair by the Windows boot sound just because you increased the volume for a DVD.

Josh Norem: It's absolutely crucial that Microsoft make the Windows Update service easily accessible to people who don't use *Internet Explorer*. Remove the dependence on *IE*-only ActiveX controls!

Logan Decker: An operating system should first and foremost take care of administration and management of files and resources for the user, and Windows XP still demands too much housekeeping from us. For instance, I'd love to see the next version of Windows be able to do what the Mac has been able to do for years—maintain shortcuts so that even if the files or executables they point to are moved, the shortcuts still work.

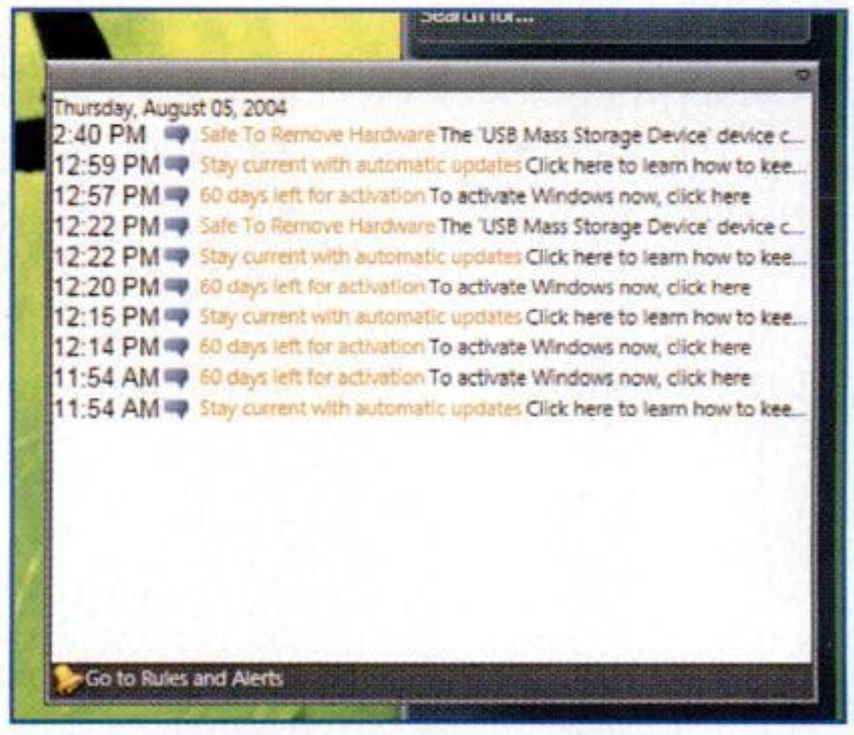
Continued from previous page

roving profiles without the hassle of administering a Windows domain.

The Longhorn Castle is a mini domain of sorts for home networks, and does not require a server. Whenever you set up a new computer on your home network, you'll add it to your castle. Machines in a particular castle will automatically synchronize user information—usernames and passwords—as well as the actual content of the user profiles. That means your bookmarks, e-mail, and application settings will automatically be shared between all the computers on your home network. Newer games that store save games and user data in the Documents and Settings tree of the hard drive will also be automatically synchronized across your home network. Pretty convenient, huh?

So, Where Do We Stand Now?

That's it—everything we know about Longhorn, packaged into one tidy and exhilarating magazine article. The upshot is that there's a lot of exciting new technology in development, and a lot of very cool features to look forward to in Microsoft's nascent, next-gen OS. We admit to being concerned about Palladium's impact on our digital media desires, but with more than 18 months until launch, it's really too early to make any judgments—or cast any aspersions. Rest assured that we'll keep you posted. And you can expect full Longhorn hands-on testing sometime next year, when the first beta ships. ■


Thursday, August 05, 2004
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12:59 PM Stay current with automatic updates Click here to learn how to kee...
12:57 PM 60 days left for activation To activate Windows now, click here
12:22 PM Safe To Remove Hardware The 'USB Mass Storage Device' device c...
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12:20 PM 60 days left for activation To activate Windows now, click here
12:15 PM Stay current with automatic updates Click here to learn how to kee...
12:14 PM 60 days left for activation To activate Windows now, click here
11:54 AM 60 days left for activation To activate Windows now, click here
11:54 AM Stay current with automatic updates Click here to learn how to kee...
Go to Rules and Alerts

One of Microsoft's goals with Longhorn is to make information more accessible. To wit, many of the new sidebar widgets include popup windows of their own. This one shows the last few system notifications we received.

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Turn WinXP into Longhorn

Here are 4 steps you can take today to make Windows XP look and function like Longhorn

SmartBarXP

SmartBarXP is a freeware utility that replicates the upcoming Windows Longhorn "sidebar." This is sort of like a vertical Taskbar, but the primary difference is that the Taskbar is used to display running applications whereas SmartBar can be used to display a wide range of data, such as system performance, news feeds, the time, and more. It works by hosting numerous "panes," each of which you can configure to display practically any information your heart desires. The best part is that the bar is 100 percent customizable, so you're not forced into displaying a clock or stock ticker, for example, if you don't want to. Plus, you can make it auto-hide, or set it to have a custom level of transparency (in the above screenshot, its set to about 30 percent).

www.smartbarxp.com

WindowBlinds with Longhorn Theme, New Bliss Wallpaper

If you want XP to look and feel like Longhorn (at least in its present implementation), install a Windows skinning utility such as *WindowBlinds*. Although we're generally wary of intrusive software like this (it re-skins your entire OS, including folders, menus, windows, etc), we have experienced little trouble using *WindowBlinds'* Longhorn Slate 4051 skin, which is a dead ringer for the beta versions of Longhorn thus far. It literally transforms XP into an entirely new-looking OS, complete with Longhorn-like menus, windows, and more. The only thing missing is the 3D interface. The new skin combined with this Longhorn beta version of the all-new "Bliss" wallpaper, makes it look exactly like you're running Longhorn. Fool your friends!

www.windowsblinds.net

Windows Media Player 10 with Compact Skin

The beta version of *Windows Media Player 10* (the final version should be available by the end of the year) was designed with Longhorn in mind, so it's not surprising that, when combined with the "Compact" skin, *Media Player 10* perfectly matches the Slate skin we've seen in the early versions of Longhorn. There's a good chance *WMP* will be completely revved by the time Longhorn comes out, but until then this is as close to "next-gen" as you can get.

www.microsoft.com/wmp

dtSearch

Longhorn's upcoming Windows File System (WinFS) will reportedly allow contextual searches as well as the ability to scan your entire system in seconds thanks to its database structure. But here's a news flash: You can get this functionality now using *dtSearch*, a powerful filing system *Maximum PC* discovered as a way of quickly searching through all the content from our issue archives. Once *dtSearch* scans the files and directories you specify, it creates an index that allows it to retrieve files instantly. It not only pulls up file names but also words within the individual files too, and you can search using more than two dozen different search methods including fuzzy searching (for animal pictures), Boolean queries, and more. Sounds familiar, right?

www.dtsearch.com

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OUR MISSION:

Find the best gaming PC ever built

Benchmarks

3DMark 2003	AquaMark 3 GPU	DOOM 3 (1280x1024)	Far Cry (1280x1024)
3DMark 2003 CPU	AquaMark 3 CPU	DOOM 3 (1280x1024, 4xAA)	Far Cry (1600x1200)
3DMark 2003 (1600x1200, 4xAA)	AquaMark 3 OV	DOOM 3 (1600x1200)	
		DOOM 3 (1600x1200, 4xAA)	

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LINE 'EM UP AND SHOOT 'EM DOWN!

Only the strongest, fastest PCs survive in Maximum PC's high-end DESKTOP DEATHMATCH

BY GORDON MAH UNG

Does your PC make *Far Cry* look more like a *PowerPoint* presentation than a 3D shooter? Are you playing *Doom 3* at camera-phone resolutions? Then it's time to beef up with a new PC. And we're not talking about the $1,000 rig you can buy at the warehouse club along with a year's supply of paper towels, cashews, and athletic socks. Nay. This is *Maximum PC,* bud. The big leagues. And for today's games, you need some serous firepower.

To find the fastest gaming PC in town, we challenged six top PC makers to send us the most powerful gaming PCs they could assemble. While we pretty much let the vendors go plumb crazy with whatever specs and overclocking they wanted, we did have several rules:

Rule #1: Whatever you see here *must* be available for sale to the public. Prototype hardware was acceptable, but the vendor had to promise to offer production units by the day this issue hits newsstands.

Rule #2: Vendors had to deliver the system at or near the price presented here.

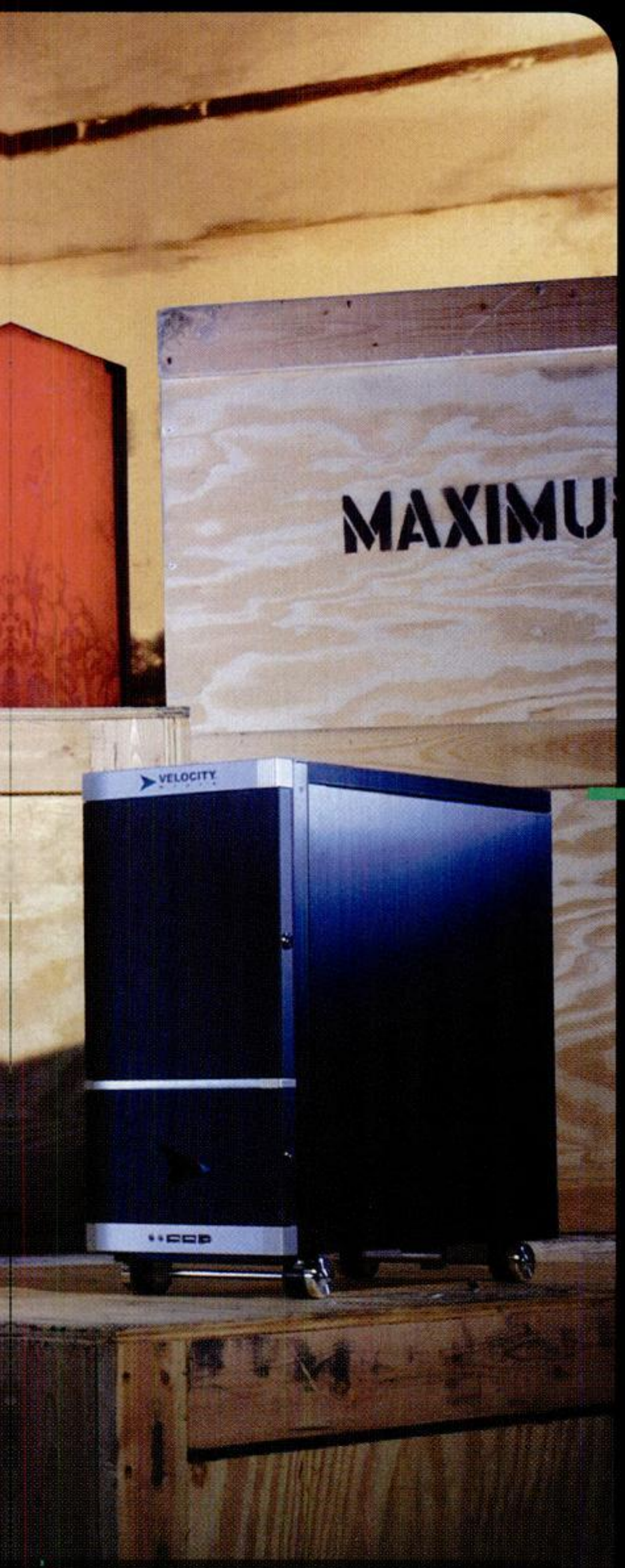
Rule #3: If the machine is overclocked, it has to be mighty stable—or there would be hell to pay.

We also enforced a stringent deadline for our desktop deathmatch. Companies that missed our cutoff date missed the opportunity to participate. The reason for this is that, in the past, vendors have pushed us for "one more day" to get the extra part or driver build that would give their PCs the edge.

Finally, while other magazine roundups of this type are annual events that are announced well beforehand and planned for months, we gave each vendor only about two weeks to configure, build, and test the machines you see here. In our minds, this is the fairest test of each manufacturer's PC-building capabilities; allowing months of notice lets the biggest vendors stockpile the fastest parts.

So who makes the fastest gaming PC in town? It's time to find out.

by mankind



Jedi Academy (1600x1200, 4xAA)
Halo 1.013 (1600x1200, 4xAA)
UT2003 Fly By (1600x1200, 4xAA)

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ABS ULTIMATE X6

With a reputation for providing quality parts at low prices, ABS isn't typically mentioned in the same breath as Falcon Northwest, Voodoo, and Alienware. Knowing this, ABS played it straight and down the middle with its Ultimate X6 PC, one of only two Intel-equipped rigs in the deathmatch. A 3.4GHz Pentium 4 Extreme Edition fills the SocketT riding on an Asus P5AD2 motherboard.

Like the Falcon rig, the Ultimate X6 features forward-looking PCI Express support, Corsair Micro DDR2, the de rigueur Western Digital Raptor RAID array, and nVidia's GeForce 6800 Ultra. ABS chose not to overclock the CPU and videocard; the latter runs the default clock speeds: 400MHz in the core and 1100MHz memory. As one of two systems that don't include a soundcard, ABS can argue that the onboard Intel HD Audio implementation is at least spec'd to support 24-bit/96KHz audio.

The X6's Lian Li PC-V1000 case really stands out. Screaming "G5 envy," the PC-V1000 is durably constructed and features an inverted motherboard design that places the GPU upside down in an effort to increase the cooling of the videocard. With the exception of the sharp, serrated edges, we like the case—it offers slots for no less than six hard drives, space ABS takes advantage of by supplementing the Raptor's fast but sparse 140GB with a 200GB Maxtor drive.

Aside from slightly sluggish performance, our main criticism of the X6 is that its wiring job and other pre-shipping preparations could be better. We were completely puzzled and annoyed by the lack of USB support; it appears that someone in manufacturing disabled the USB ports. Compounding this problem, the BIOS is password-protected. That's not a good sign.

Despite these shortcomings, the Ultimate X6's boasts an impressive price-to-performance ratio. Overall, it's a great value. But the P4 Extreme is clearly outclassed by the Athlon 64s and the highly overclocked P4 in Falcon Northwest's Mach V.

ABS ULTIMATE X6

MAXIMUM PC verdict 7

$3,300, www.abspc.com

That's no G5, it's an ABS!

VOODOO RAGE F:2 INTERCOOLED

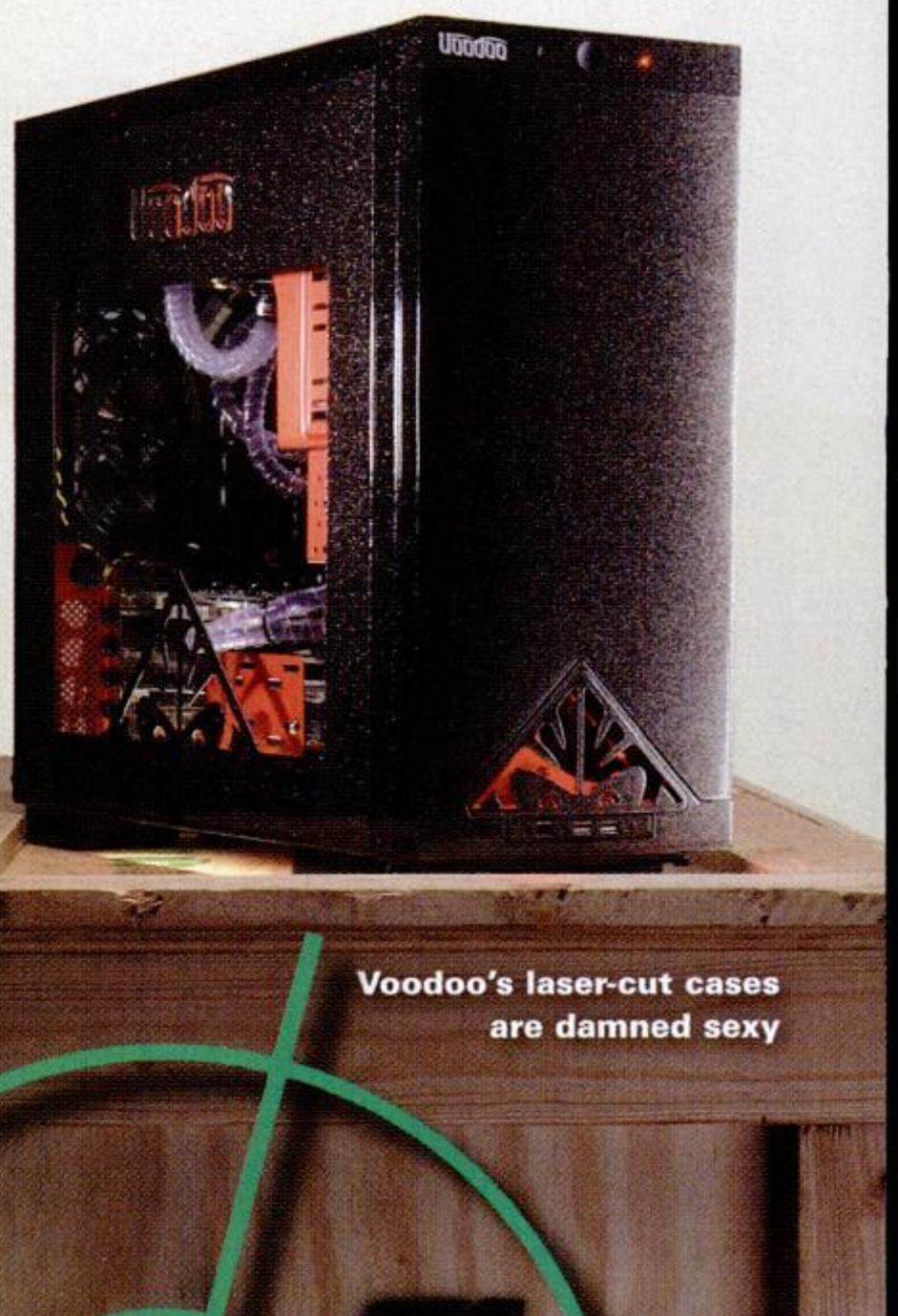
Of all the participating vendors, we suspect our short deadline may have put the worst crimp on Voodoo. Known as one of the trendsetters in PC design and appearance, Voodoo's motto for its high-end machines has long been, "It'll be ready when we finish it." The company's sensitivity to strict deadlines would certainly help explain the Voodoo Rage F:2's mixed results.

First, the GeForce 6800 Ultra had problems running at its overclocked speed of 439MHz. While it ran *3DMark 2003* fine, we experienced corruption and crashing in *Jedi Academy* and *Doom 3*. That just goes to show you that even a water-cooled CPU and videocard can have problems. To complete our tests, we were forced to knock the card back to its stock 425MHz core and start all over again, which was a tad bit annoying, to say the least.

With its CPU and videocard back to stock speed, we didn't think the F:2 had much of a chance, but Voodoo fooled us. The machine managed to win the *Jedi Academy* test (which previously caused it to crash), one of the *Doom 3* tests, and one of the *Far Cry* tests. That's pretty damned impressive.

The system itself is state of the art with its Socket 939-based Athlon 64 FX-53. Unlike Velocity Micro and Alienware, Voodoo opted to pair the GeForce 6800 Ultra with a new MSI K8N Neo 2 motherboard featuring the nForce3 Ultra chipset. This also might explain the performance results. Even at its stock speeds, the F:2 managed to pull a few wins away from all the other machines here.

For a machine made in a week and a half, the F:2 is a beaut. The case is



Voodoo's laser-cut cases are damned sexy

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based on a Lian Li frame, and the paint job is about as good as it gets, with a sparkling metallic black exterior that is gratifyingly smooth to the touch and a brilliant red interior. In the past, Falcon Northwest's paint jobs have generally been regarded as the best in the biz, but we think Voodoo is catching up. Other cosmetic touches that impressed us: a matching aluminum bezel for the 12x Plextor drive, laser-cut side panels, and rubber feet bearing the Voodoo symbol.

The F:2's biggest weakness is that at stock speeds it couldn't top the Alienware system's performance. While it did manage to pick up a few gold medals in our rigorous suite of Lab tests, it places behind the other two water-cooled rigs. It is, however, amazingly quiet.

VOODOO RAGE F:2 INTERCOOLED

MAXIMUM PC verdict 6

$5,000, www.voodoopc.com

ZEUS TSUNAMI M-6

As the only PC here equipped with an ATI Radeon X800 Pro (not even an X800 XT Platinum Edition), Zeus PC's Tsunami M-6 is like a guy who walks into a gunfight equipped with a spork. The fact that Zeus PC also chose to forego the Athlon 64 FX in favor of the budget buyer's favorite, the Athlon 64 3800+, doesn't help.

In benchmarks you can probably imagine where the Zeus' hardware ranked. And heck, you don't even get a soundcard with the Tsunami M-6. While games such as *Doom 3* don't actually support any DirectSound3D sound acceleration a la Creative Labs' Audigy 2 series or nVidia's nForce chipset, we'd still like better DACs than the Asus A8V's 18-bit onboard RealTek units.

So what's positive about the Ultimate M6? That depends on how you look at it. If you're expecting balls-out gaming speed, you're out of luck. But if you think of the Tsunami M-6 as a "fixer-upper," you might be onto something, because the Tsunami's price is a modest $2,600. For the extra cash you'd save by not buying from a boutique PC maker such as Falcon, Alienware, or Voodoo, you could buy two 6800 cards, a new motherboard that supports SLI, and even a better CPU. Of course, this doesn't really make a whole lot of sense because you could just start with those parts in the first place.

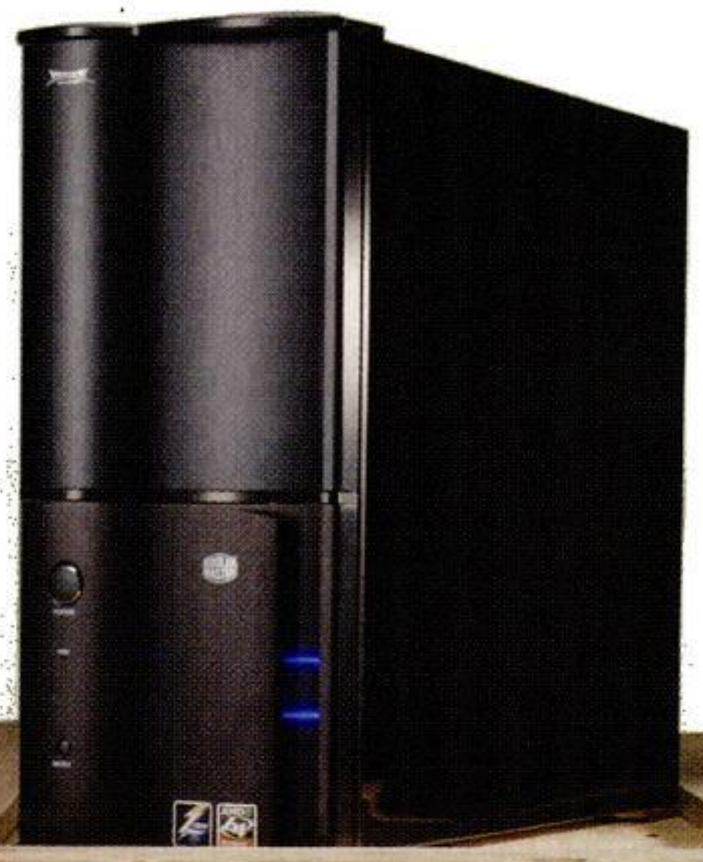
One other nice touch is the NEC ND-2510A. Of the vendors here, only Zeus and Falcon chose to include dual-layer, dual-format burners. It's not essential in a gaming rig, but dual layers should be a standard spec for today's high-end machines. We also continue to love Cooler Master's Wave Master case. Furthermore, because the Tsunami isn't overclocked, it turned out to be the quietest machine in the bunch.

Unfortunately, for the purposes of this story, frame rates matter more than anything else, and the Tsunami just isn't capable of running with the big dogs. Coupled with the poor wiring job—a loose cable was used to wrap the main wiring trunk—and lack of decent onboard or outboard audio, the Tsunami needs a serious overhaul.

ZEUS TSUNAMI M-6

MAXIMUM PC verdict 5

$2,600, www.zeuspc.com



The Tsunami got washed away in a storm of faster, albeit pricier, gaming rigs.

ANYTHING BUT AVERAGE

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VELOCITY MICRO GAMER'S EDGE FX

It's hard to believe that Velocity Micro has gone from kitchen-table PC maker to high-end contender in just a few short years. The company definitely seems to "get" PC-building. The understated-looking Gamer's Edge FX is a great example.

Even though it lacks a laser-cut door, exotic water-cooling, or a fancy-pants paint job, a large number of people in our office love this system's looks. Using the same Lian Li chassis as the Voodoo case, Velocity Micro's presentation eschews ostentatious over-the-top adornment in favor of a unified, utilitarian theme.

Internally, an overclocked Athlon 64 FX-53 is paired with an Asus A8V Socket 939 motherboard, a pair of Raptors, an overclocked GeForce 6800 Ultra card, and 1GB of DDR400.

Unfortunately, like the Voodoo Rage F:2, the Gamer's Edge experienced a few hiccups during Lab tests, forcing us to reset the CPU clock speeds to stock levels just to install certain applications. And even then, we experienced odd video corruption. After a full system restore and some troubleshooting assistance from Velocity Micro, we were able to get the Gamer's Edge FX's GeForce card running at its original OC'd speed of 440MHz and were also able to bump the CPU clock back to 2.47GHz. Everything worked fine except for our *Jedi Academy* test. Ultimately, no matter how we tested it, the Gamer's Edge never hit the frame rates we expected. It's not clear to us—or the company—what the hell went wrong.

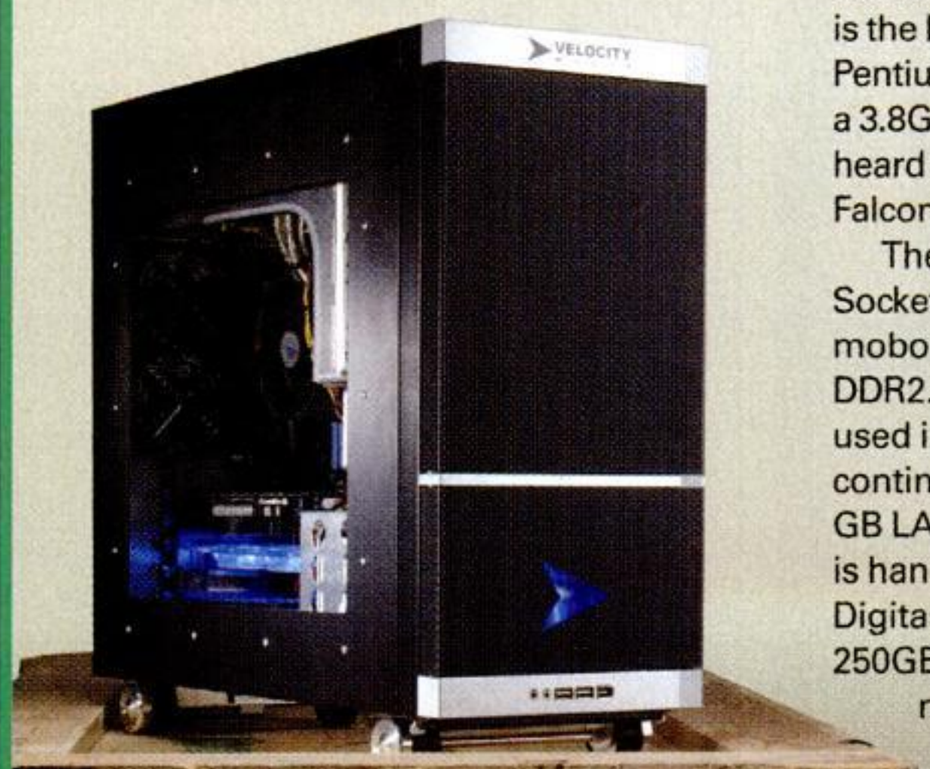
At press time, Velocity Micro officials told us they were a week away from implementing a water-cooling solution, which would make for a much quieter system than the current air-cooled, overclocked configuration is capable of. As it stands, the Velocity Micro is one of the loudest in the group.

One thing we love about the Gamer's Edge FX is its price. At $3,600, it gives you 95 percent of the performance afforded by the top-tier systems here at just two-thirds the cost. Unfortunately, performance and stability matter more than anything else in this deathmatch. Just as we dinged the Voodoo Rage F:2 for forcing us to tinker, we have to do the same with the Gamer's Edge FX.

VELOCITY MICRO GAMER'S EDGE FX

MAXIMUM PC verdict 6

$3,655, www.velocitymicro.com



The Gamer's Edge FX has strong aesthetic appeal even though it lacks the exotic paint and flashy looks of some other rigs here.

FALCON NORTHWEST MACH V ICON EXOTIX

Falcon Northwest likes to say it was the very first US company to build PCs that cater to gamers. This is a legitimate claim, and as such, the old-time gaming PC shop has an arsenal of tricks in its toolbox. A shining example of Falcon's prowess is the Mach V Icon Exotix.

Instead of using the popular Athlon 64 FX, Falcon attempted to out-muscle its competitors with a highly overclocked Pentium 4. How high? How does 4.28GHz sound? That's well beyond the clock speed we hit with last month's overclocked Dream Machine 2004 (which ran at 3.97GHz). But Falcon has two advantages: The first is a new custom-designed water-cooling scheme that vents hot air out the top of a Silverstone Nimiz case through a massive radiator. The second is the base CPU. We started with a 3.6GHz Pentium 4 in the DM2004; Falcon started with a 3.8GHz P4 for this monster rig. You haven't heard of a 3.8GHz P4? Neither had we until Falcon's PC arrived.

The 4.28GHz P4 is locked into a SocketT in an Asus P5AD2 Premium mobo that's stuffed with 2GB of DDR2. This is the same board we used in the Dream Machine, and it continues to wow us with its dual GB LAN and onboard Wi-Fi. Storage is handled by a pair of Western Digital Raptors and a single WD 250GB drive. Falcon ditched the mobo's onboard 24-bit audio in favor of the Audigy 2 ZS.

One nice touch we appreciate: like the Zeus PC, the Mach V Exotix offers a dual-layer burner.

The exotic, hot-rod-worthy paint job, dubbed "Red Death," received mixed reviews from our staff. Not everyone went for the Khmer Rouge motif (a pile of skulls painted along the side of the case), but gamers who get a kick out of shot-gunning zombies will dig it.

Of the six boxes here, only the ABS Ultimate X6 and this Mach V are truly forward-looking. While there's no real indication that PCI Express graphics cards offer better performance, we're certain that in 12 to 24 months (around the time you'll want to replace your videocard), you'll be kicking yourself if you haven't invested in the technology.

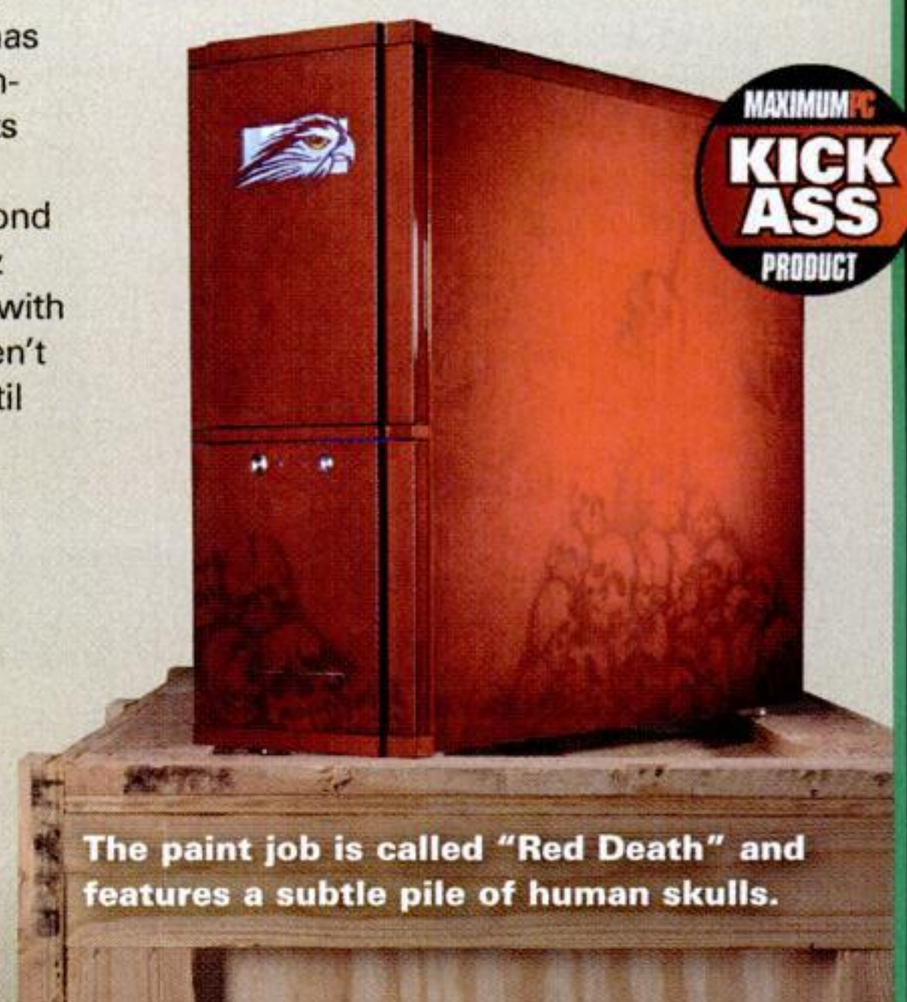
Finally, of all the overclocked boxes in this roundup, the Mach V gave us the least problems on boot. The machine booted quickly and ate its way through the benchmarks without a single crash or glitch. The Mach V smoked all others in *AquaMark 3* and was one of just three machines here to break 13K in *3DMark 2003*. Let's just say the Mach V's only real competition came from Alienware.

Our only qualm with the Mach V is its hefty price. We're used to seeing big price tags on systems, but this pushes the top end at $7,300. (You can shave a grand off the price if you forego the paint job.) Regardless, Falcon Northwest continues to impress us with its technical prowess. If money is no object, this is clearly the PC for you.

FALCON NORTHWEST MACH V ICON EXOTIX

MAXIMUM PC verdict 9

$7,300, www.falcon-nw.com



The paint job is called "Red Death" and features a subtle pile of human skulls.

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ALIENWARE AURORA ALX

Although Alienware is one of the oldest and most respected names in performance-gaming PCs, the company has had a tough time shaking the "mainstream" label slapped on it a couple of years ago.

To say the company is a little touchy about the mainstream moniker is an understatement. As a countermeasure, Alienware has introduced its new ALX series of machines, which are intended to help it reclaim any hardcore ground lost to Falcon Northwest and Voodoo PC.

Although we hoped to see a rig with Alienware's upcoming dual-videocard solution, the company instead sent us an Athlon 64 FX-53 in a new proprietary water-cooled ALX case. When we posted the machine and saw that the Athlon 64 FX-53 had been overclocked from 2.4GHz to 2.6GHz, we knew the Aurora ALX would be a formidable force. And Alienware didn't just overclock the CPU; it also took the GeForce 6800 Ultra from a stock clock of 425MHz to 450MHz.

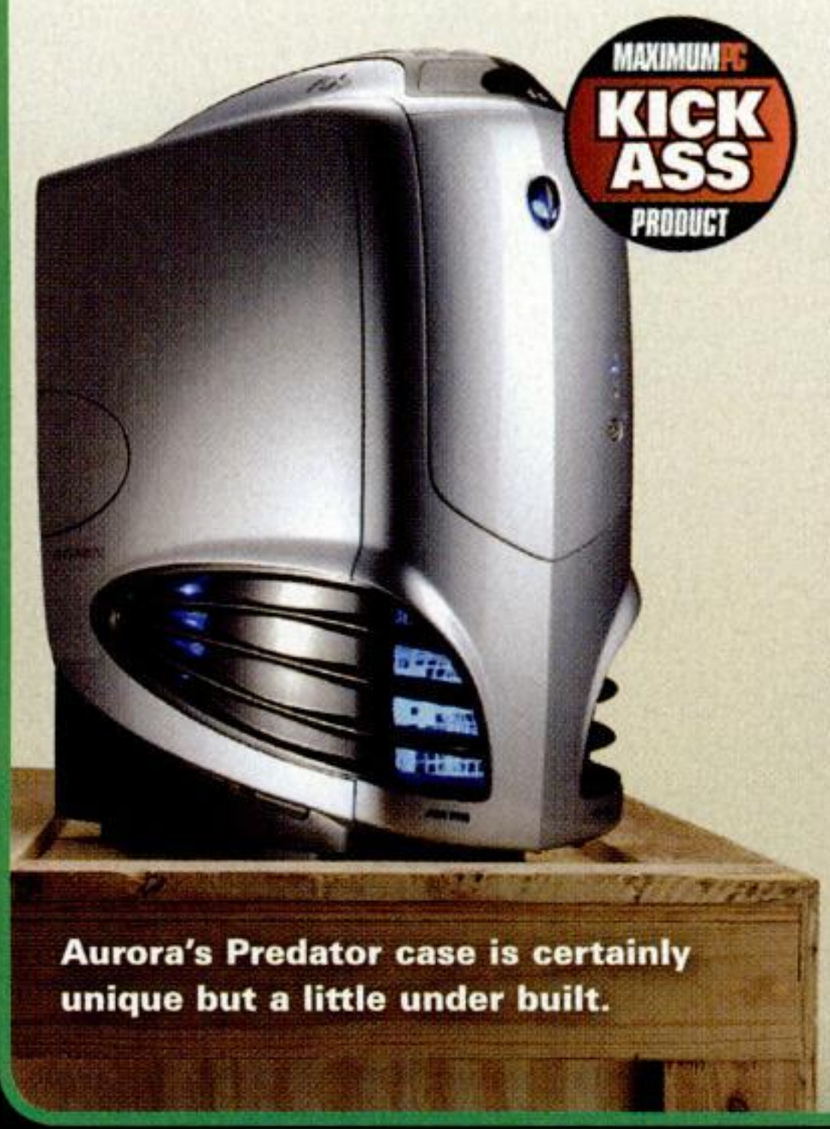
In terms of specs alone, the Aurora outclocked every other Athlon 64 and GeForce 6800 Ultra in the roundup. Of course, the real showdown occurs in our Lab's benchmarking tests, and in that respect the Aurora and Athlon 64 FX didn't disappoint. The Aurora won no fewer than nine of our benchmark rounds with its 2.6GHz FX. Although the Mach V closely nips at its heels, the Aurora/AMD combo simply outran the crowd.

The machine itself is built on an Asus A8V board in Socket 939 trim and comes with 1GB of DDR400 RAM, a Raptor RAID, Audigy 2 ZS, and a Plextor PX-712A and Premium CD-RW drive.

The Aurora's water-cooling system lets you manually choose between three fan speeds to meet your conditions. While it's very quiet on the lowest setting, the fan churn of the highest setting made it the loudest machine in our deathmatch.

The case itself is a slight modification to the standard Alienware Predator case, with a little extra headroom for the water-cooling and blue LED (which tells you what temperature the proc is running at) embedded in the system's "forehead." While we still love the unique look, we weren't too happy with our review unit. We found the small side-cover difficult to close, and the front-door latch broke the second day of testing. Our ultimate chassis for this rig would be the Predator case cast in aluminum; while expensive, that would be one hell of an enclosure.

Despite our kvetches, it was clear during testing that this deathmatch would boil down to a battle of two: Alienware vs. Falcon Northwest. Read on to find out which company wins.



Aurora's Predator case is certainly unique but a little under built.

ALIENWARE AURORA ALX

MAXIMUM PC verdict 9

$5,000, www.alienware.com

How We Test: Gaming Performance PCs

Because this PC shootout is all about gaming performance, we threw out the usual suite of benchmarks. *SYSmark 2004* remained in its jewel case and we gave both Adobe *Premiere* and *Photoshop* the week off. We focused our testing on games, games, and more games.

For our tests we tapped the old standby *3DMark 2003*. Although once the target of considerable and quite controversial "optimizing," *3DMark 2003* remains a valid benchmark of a 3D card's performance because, while it leans on the CPU somewhat, it's mostly a GPU test. We ran it at the default resolution of 1024x768 as well as 1600x1200 with 4x antialiasing on. We ran and reported the CPU portion of the test as well. We also used *AquaMark 3* as a DX8.1 test; we ran the default test, recorded the default score, and also broke down the individual GPU and CPU scores.

Jedi Academy continues to be a CPU-limited benchmark even at 1600x1200 resolution with 4x AA enabled. Halo is the opposite of *Jedi* and mostly taps the GPU core. We ran our standard custom demo at 1600x1200 without AA enabled. *Unreal Tournament 2003* is an oldie but still quite telling as an overall system benchmark. (You know these boxes are fast when they can break 200fps at 1600x1200 with 4x AA on.)

We were excited to see how this batch of PCs fared with *Far Cry*, the summer's sleeper hit, and a game that brought many a system to tears with its heavy-duty GPU requirements. We ran *Far Cry* at 1280x1024 and at 1600x1200. For the most part, it runs fast if you have a fat 16-pipe GPU.

Our final performance benchmark was *Doom 3*—the game people have waited years for. As a technical tour de force, people are building whole systems around this one game's system requirements and recommendations. We ran the standard timedemo at 1280x1024 and 1600x1200 with 4x AA enabled and disabled. For the most part, *Doom 3* almost exclusively tests the GPU.

Last, we performed the first annual Maximum PC "Hot Box" test. Any high-performance machine can function in the 68° F environment of our Lab, we reasoned, but how about in a typical house on a balmy summer day? To find out if these systems could handle extreme temperatures, we locked all six in a tiny room heated to 90° F and ran *CPU Burn-In*, which constantly cranks FPU intensive chores through the chip. We thought we'd break at least one of the overclocked systems, but after six hours in the sweatbox, we broke the room instead. Our demo room couldn't handle the power requirements of our machines as they warmed up. Why did they last six hours? We suspect that as the cumulative heat increased inside the machines, the power efficiency on the power supplies dropped. While it's disappointing that we couldn't bring any of the PCs to their knees, it's comforting to know that all of these rigs can operate full-bore in 90 degree ambient temperatures without any data corruption.

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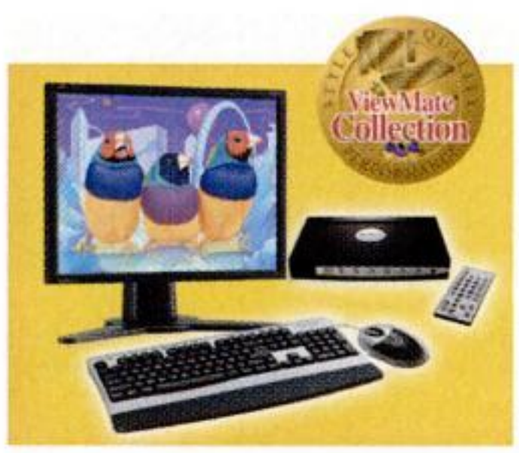

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Conclusions and Benchmarks

THE WINNER BY A HAIR!

It's funny how two completely different CPUs, chipsets, and systems could produce such similar benchmark results. While Alienware placed first in more categories—nine, to be exact—Falcon Northwest's system was really close behind. In fact, in three tests—*AquaMark's* GPU and CPU tests, and *Doom 3* at 1600 x 1200—the Mach V out-muscled all the contenders, including Alienware's Aurora. Likewise, Voodoo's Rage F:2 managed to outscore the Falcon and Alienware systems in three benchmarks—*Jedi Academy*, *Doom 3* at 1280x1024, and *Far Cry* at 1280x1024. How is this possible? We suspect it's a function of the nForce3 Ultra chipset—or errors produced by the overclocked videocards slowed the others down just enough for the stock Voodoo to breeze by.

Unfortunately, the Voodoo system's initial stability issues dropped it to third place, leaving it to either Alienware or Falcon to claim victory.

At one point, Alienware's Aurora looked like the sure winner based on the merits of its superior performance numbers across multiple categories. But as we considered its busted front door, flimsy side-panel door, and the fact that its plastic case just doesn't feel as solid as the Mach V, we began leaning toward the Falcon, despite its second-place performance. But alas, while we're not like other magazines that get overly concerned with price, the fact that Falcon's Mach V costs $2,300 more than the Aurora while losing in nine benchmarks ultimately hurt it.

Both machines are freaky-fast, but only one can be declared winner. So, at the end of all our testing and judging, we deem Alienware's Aurora the superior PC and winner of our 2004 Desktop Deathmatch, with Falcon's Mach V a very close second.

FALCON NORTHWEST: MR. CONGENIALITY

When we held our staff-wide secret ballot to decide which of our six contestants was easiest on the eyes, the results were close. Initially, it was a three-way tie between Falcon Northwest's Mach V, Velocity Micro's Gamer's Edge FX, and Voodoo's Rage F:2. After considerable debate and a controversial run-off, the Mach V's professional-looking cherry-red custom paint, ghoulish Khmer Rouge overtones, and back-lit laser-cut front panel punched the majority of our staff's buttons. ■

MAKE	ALIENWARE	FALCON NORTHWEST	ZEUS	ABS	VELOCITY MICRO	VOODOO
MODEL	Aurora ALX	Mach V	Tsunami M-6	Ultimate X6	Gamer's Edge FX	Rage F:2 Intercooled
CPU	2.6GHz Athlon 64 FX-53	4.28GHz Pentium 4E	2.4GHz Athlon 64 3800+	3.41GHz Pentium 4EE	2.47GHz	2.46GHz
RATED CPU	2.4GHz Athlon 64 FX-53	3.8GHz Pentium 4E	2.4GHz Athlon 64 3800+	3.4GHz Pentium 4EE	2.4GHz Athlon 64 FX-53	2.4GHz Athlon 64 FX-53
MOTHERBOARD	ASUS A8V	ASUS P5AD2 Premium	ASUS A8V	ASUS P5AD2	ASUS A8V	MSI K8N Neo
CHIPSET	VIA K8T800 Pro	Intel 925X	VIA K8T800 Pro	Intel 925X	VIA K8T800 Pro	nForce3 Ultra
PSU	PC Power TurboCool 510 Deluxe	Enermax 550	Antec TruePower 550	Antec TruePower 480	Enermax 500 watt	Voodoo Enermax 600 Noise Taker
RAM	1GB DDR400	2GB DDR2 / 533	1GB DDR400	1GB DDR2 / 533	1GB DDR400	1GB DDR400
GPU MAKE/MODEL	GeForce 6800 Ultra	GeForce 6800 Ultra Express	ATI Radeon X800 Pro	GeForce 6800 Ultra Express	GeForce 6800 Ultra	GeForce 6800 Ultra
GPU CLOCKS	450 / 1100	440 / 1100	547 / 1100	440 / 1100	440 / 1180	439 / 1100
HD	2 WD 740GD	2 WD 740GD 250GB WD SATA	2 WD 740GD	2 WD 740GD 200GB Maxtor	2 WD 740GD	2 WD 740GD
HD CONFIGURATION	RAID 0	RAID 0	RAID 0	RAID 0	RAID 0	RAID 0
OPTICAL 1	Plextor Premium CD-RW	Sony DRU-700A Toshiba M1712	NEC ND-2510A	JLMS-HD1665	Lite-On SOHC-5232K	Plextor PX-712A
OPTICAL 2	Plextor PX-712A	—	—	Plextor PX-712A	Lite-On SHOW-1213S	—
AUDIO SYSTEM	SB Audigy 2 ZS	SB Audigy 2 ZS	Onboard	Onboard	SB Audigy 2 ZS	SB Audigy 2 ZS
3DMARK 2003	**13514**	13429	11715	12104	13042	12736
3DMARK 2003 CPU	**1176**	1138	736	993	1067	1134
3DMARK 2003 (1600X1200, 4XAA)	**5595**	5434	4616	4969	5448	5161
AQUAMARK 3 GPU	**10917**	10782	8748	9642	10497	9978
AQUAMARK 3 CPU	11112	**11622**	9922	9973	10292	11468
AQUAMARK 3 OV	73209	**73661**	60723	65001	69527	69542
JEDI ACADEMY (1600X1200, 4XAA)	143.3	140.1	113	118	89	**143.5**
HALO 1.013 (1600X1200, 4XAA)	**71.3**	69.11	54.0	59.06	68.9	64.07
UT2003 FLY BY (1600X1200, 4XAA)	**230**	223	143	205	220	214
DOOM 3 (1280X1024)	83.4	86.3	57.8	77.1	86	**87.3**
DOOM 3 (1280X1024, 4XAA)	**57.6**	57.2	35.7	52.7	55.9	54.7
DOOM 3 (1600X1200)	72.0	**72.2**	44	65.3	70.6	70.0
DOOM 3 (1600X1200, 4XAA)	**43.8**	43.3	26.3	40.1	42.4	41.1
FAR CRY (1280X1024)	74.2	74.5	57	62.5	71.5	**76**
FAR CRY (1600X1200)	**68.8**	67.2	57.2	58	65.2	65
PRICE	$5,000	$7,300	$2,600	$3,300	$3,655	$5,000

*Winning scores are bolded

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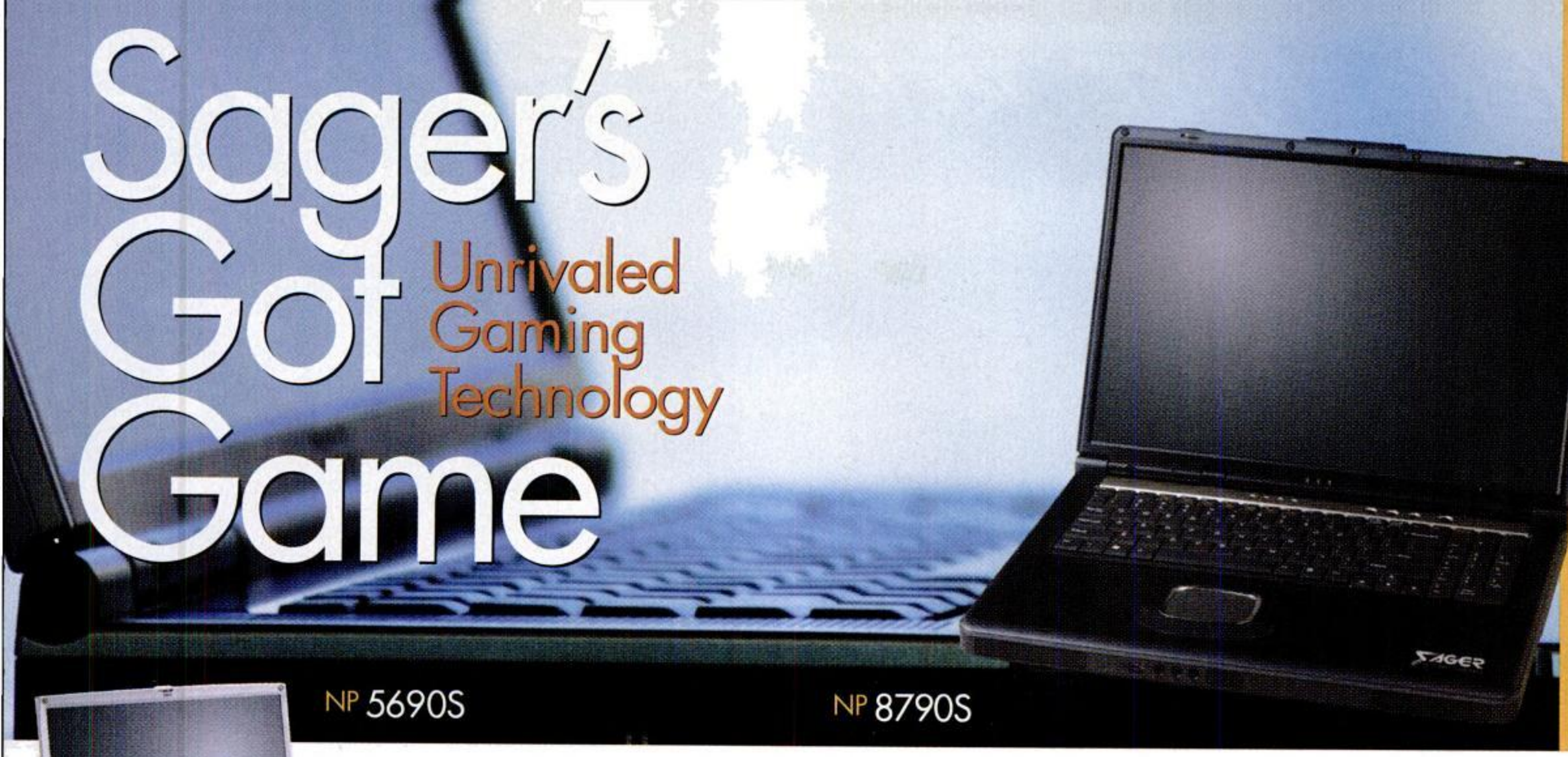

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THE 10 BEST UTILITIES YOU'VE NEVER HEARD OF!

DEEP WITHIN THE RECESSES OF THE INTERNET, BEYOND THE SCOPE OF UNSUSPECTING EYES, LURK A NUMBER OF LITTLE-KNOWN SOFTWARE UTILITIES THAT HAVE THE POWER to change your life. Skeptical? We were too when Editor-in-Chief George Jones tasked us with this mission. Sure, we're all for giving obscure PC-enhancing applications the attention they deserve, and enriching the lives of PC enthusiasts in the process. But our expectations were modest. After all, how many worthwhile utilities could possibly exist that the voluminous PC brains at MAXIMUM PC didn't already know of?

Truth is, we were shocked and humbled by the bounty we found. Indeed, we'll be darned if the 10 awesome utilities presented here don't belong in every power-user's toolbox. What's more, all but two of them are totally free! (Demos for all of them are included on the Maximum CD.) So what are you waiting for?

—BY JOSH NOREM

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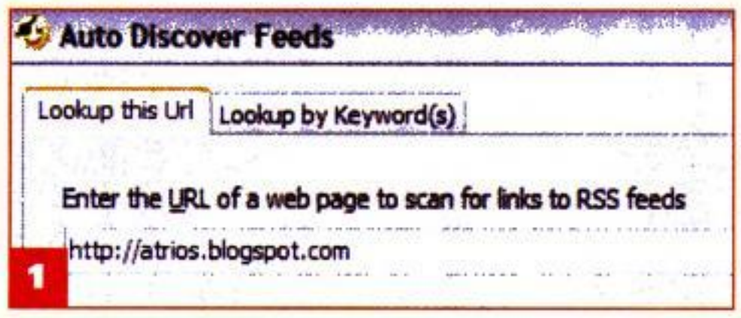
1. RSS BANDIT

GET THE NEWS AS IT HAPPEN

One of the greatest inventions of our time is the RSS feed. There are different interpretations of the acronym, "rich site summary" and "RDF site summary" being the most common, but what you need to know is that an RSS feed is a synopsis of a web site's most current content. For instance, all the major news sites typically offer an RSS feed that includes the major headlines of the day, and the feed is updated as new stories are posted. It's similar to a stock-ticker in that it feeds real-time information about any changes or updates made to a web site. There are numerous utilities available to manage these streams, but none are as elegant as *RSS Bandit*.

This utility's interface is similar to Windows Explorer, with the names of the feeds on the left and the contents of the feed on the right, and a pane window that displays a particular article. Although the application comes configured to manage the feeds of several popular sites, you can add your own feeds as well. You can even search for feeds via keyword, which is one of our favorite features because it simplifies the often-arduous process of locating feeds. Once you have several feeds, you need only select how often they're updated. A small popup window (which you can toggle on or off) will appear on your desktop whenever new content has been added to any of your favorite sites.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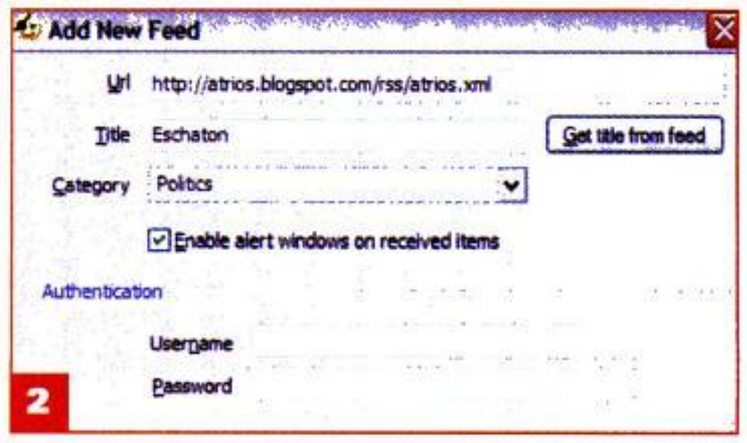
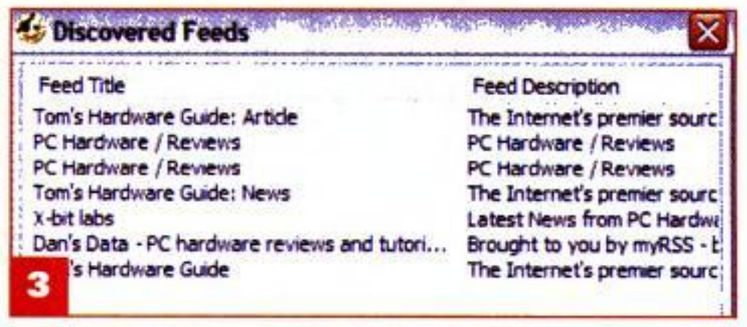
1

To get started, simply type in the URL of a site that has an RSS feed—the software will find it for you. You can even type in the name of the site's author and it will find a feed (if one is available, of course).



The *Bandit* has found the feed, so now select a category, and the feed will be added to the list for updates.



If you don't know of any exact feed locations, you can search by keyword. We did a search for "PC Hardware" and it came up with what you see here.

If we weren't so enamored of *RSS Bandit,* we'd say its ease of use was insulting to our intelligence. Plus it's totally free, and uses just 3MB of system memory. **Free, www.rsbandit.org**

2. APP ROCKET

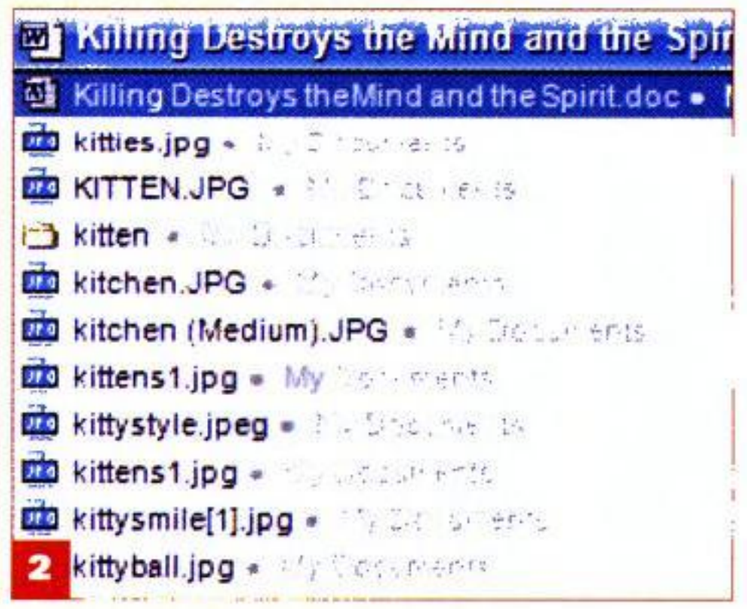
ORGANIZE YOUR DESKTOP'S MESS

Our work PCs are so cluttered with files and shortcuts that on several occasions we've demanded (to nobody in particular) a utility that can help us find items on our desktop. Someone was listening, apparently, because *AppRocket* is the utility we've long been wanting.

Launch this little rocket and it quickly scans the most common locations for files and folders and creates a comprehensive index. Then, when you're ready to do a search, just start typing the folder or file name you're looking for and you'll instantly be presented with a list of files that match up. If you want to find a file named "kitten," for example, just type it in and all matches will appear in a drawer below. If you want to adjust your Display Settings in the Control Panel, just type "D-I-S" and the link appears. It's easily the fastest way to find anything on a PC that we've ever used.

And that's just the half of it. Once you find what you're looking for, you can either open it by clicking within the app, or use the arrow keys to navigate up or down folder levels. *AppRocket* can even display ID3 information for your MP3 files, and is configured to perform web searches for a dozen popular reference sites such as Google, Dictionary.com, Amazon.com, a stock watch, and more. You can also add any folder to its index, remove file extensions you don't want included in your searches, and customize the appearance of the interface to suit your tastes.

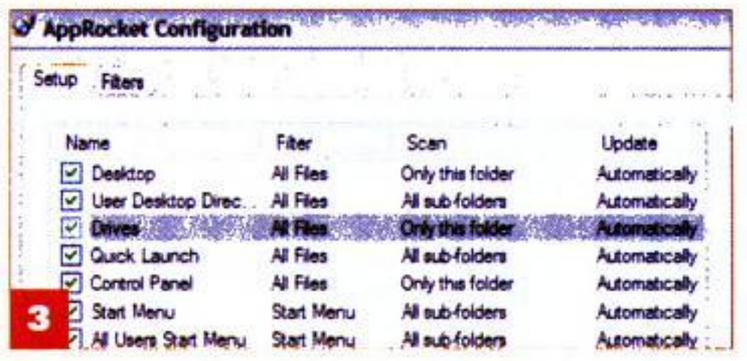
In the end, we dig *AppRocket* so much because we've never seen anything like it. It's a heck of a lot easier to use than Windows' search function and faster than Explorer too. **Free 30-day trial/ $18, www.candylabs.com**



With *AppRocket* highlighted, we type in K-I-T-T and the following appears. By default, as soon as you move the cursor away from the list of files and click on another document the application slides out of sight like an auto-hide taskbar.

1 Activation
You can access AppRocket at any time by pressing the activation keystroke on your keyboard (Alt+Space by default).
2 Search
Type to search. The selected item appears in the AppRocket bar, press the Return key to open it.
3 Results
Searching can match more than one item. All results appear in the results drawer below the AppRocket bar.
Use the arrow keys to navigate.
4 Explore
Use this menu button to access the rest of AppRocket.
5 Resize
Drag dimples to adjust the size of the results drawer and bar.
1

When you open *AppRocket*, it provides a helpful crib sheet to get you started.



If you want to reduce or increase the locations included in searches, it's easy to accomplish.

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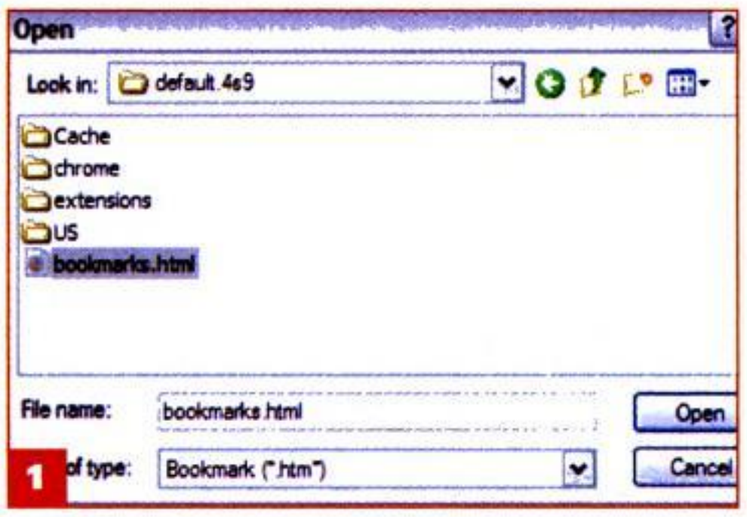
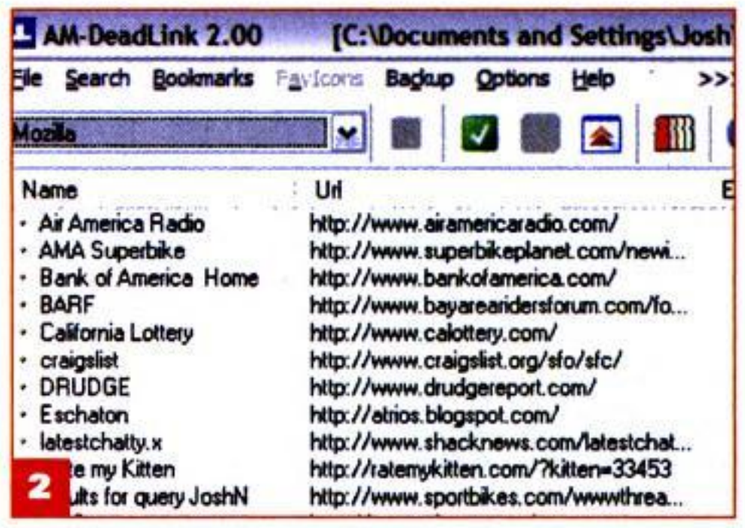
3. AM-DeadLink
Inactive bookmarks begone

You know the drill: You come across an awesome Flash-based web site with badgers bouncing up and down, and you bookmark it. And you keep doing this for every fun site you stumble upon until eventually it takes 10 minutes to scroll through the whole lot of 'em. Then one day you try to launch the badger site to show a friend, and the link is dead. You click another link and it's dead as well. *AM-DeadLink* solves this problem by detecting dead links and duplicates in any browser, including *Opera, Netscape, Mozilla,* and *Internet Explorer.*

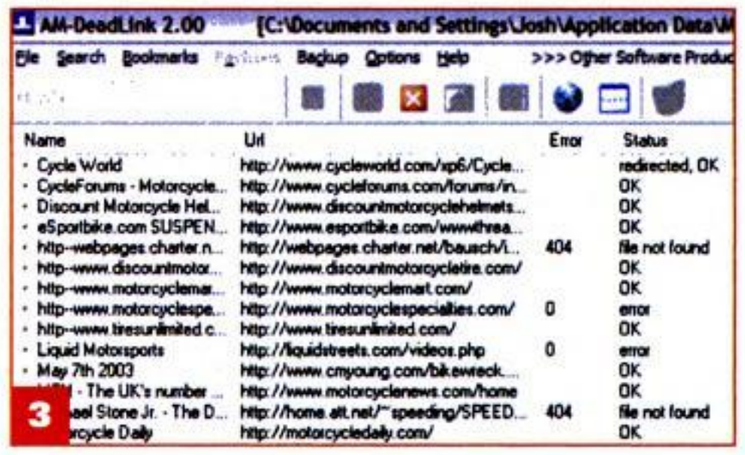
Operation is simple. Just select your browser from a drop-down menu and hit the "check" button. All links are pinged and a status message is displayed next to each bookmark. Once dead links are detected, it takes a mere two clicks to eradicate them from your bookmarks folder, allowing you to keep things nice and tidy. A split-pane view allows you to visit bookmarked sites within the application, so you can also weed out sites that are working but no longer of interest to you. On top of all that, *DeadLink* will make a backup file of your bookmarks, for safe keeping. **Free, www.aignes.com**



Once you open *DeadLink* and select your browser, it will look for the bookmark.htm file in the default location. (Warning: For *Firefox*, the utility defaults to the wrong location, so you'll actually have to browse to C:/Documents and Settings/Username/Application data, etc. in the utility's dialog box—and you'll have to be able to view hidden files to see this directory.)



Once you've found your bookmark file, *DeadLink* will display its contents. Next hit the green checkmark button to begin the validation process.

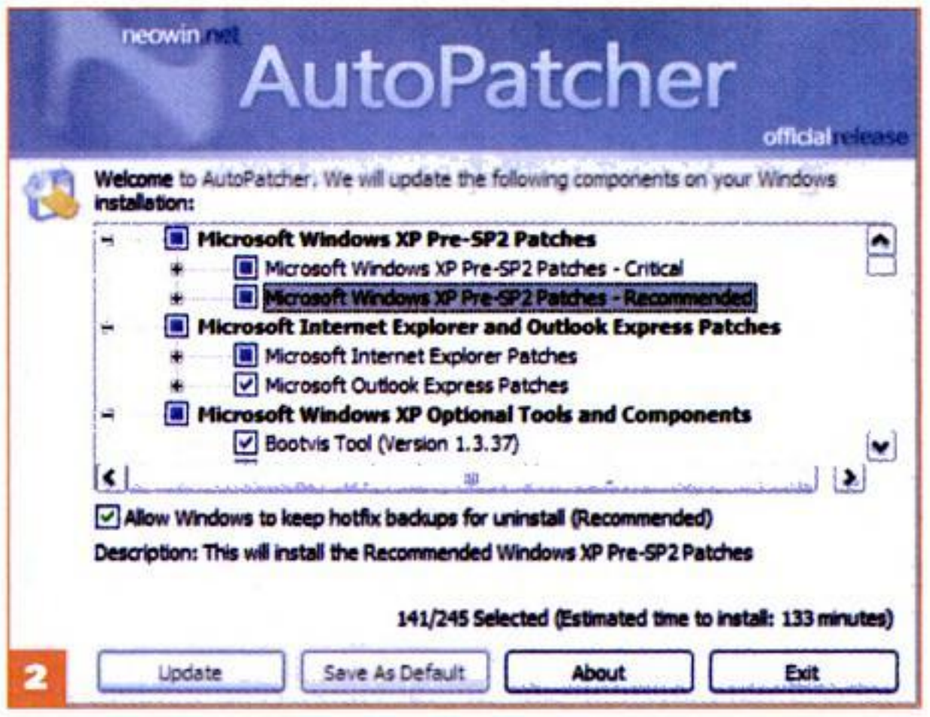

AM-DeadLink 2.00 [C:\Documents and Settings\Josh\Application Data\M
File Search Bookmarks Backup Options Help >>> Other Software Produc
Name
Url
Error
Status
Cycle World http://www.cycleworld.com/xp6/Cycle... redirected, OK
CycleForums - Motorcycle... http://www.cycleforums.com/forums/in... OK
Discount Motorcycle Hel... http://www.discountmotorcyclehelmets... OK
eSportbike.com SUSPEN... http://www.esportbike.com/wwwthrea... OK
http--webpages.charter.n... http://webpages.charter.net/bausch/i... 404 file not found
http--www.discountmotor... http://www.discountmotorcycletire.com/ OK
http--www.motorcyclemar... http://www.motorcyclemart.com/ OK
http--www.motorcyclespe... http://www.motorcyclespecialties.com/ 0 error
http--www.tiresunlimited.c... http://www.tiresunlimited.com/ OK
Liquid Motorsports http://liquidstreets.com/videos.php 0 error
May 7th 2003 http://www.cmyoung.com/bikewreck... OK
- The UK's number ... http://www.motorcyclenews.com/home OK
Stone Jr. - The D... http://home.att.net/~speeding/SPEED... 404 file not found
cycle Daily http://motorcycledaily.com/ OK
3

Once the utility has pinged all your bookmarks, it presents you with an easy-to-read display of which links work, and which don't.

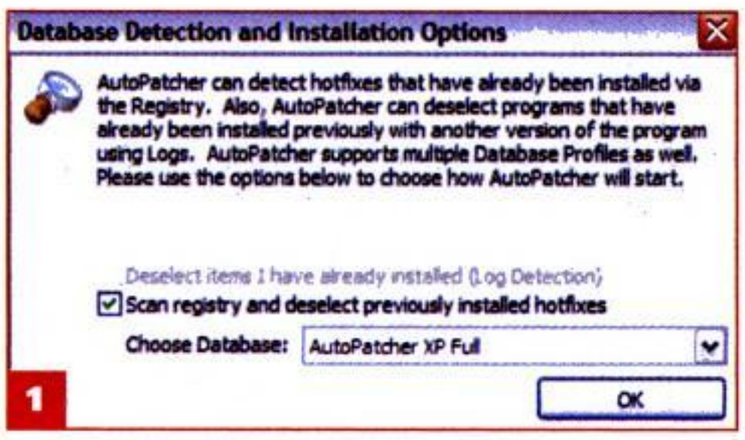
4. AutoPatcher XP
Get WinXP updates offline

Not a day goes by, it seems, without some new virus or bug or wormhole threatening the integrity of *Internet Explorer* or Windows XP, so we rely on Windows Update to save us from possible doom. But what do you do with a fresh install of XP, prior to all the essential updates? Do you really want to go online without any of the security patches installed? Are you mad? Luckily, there's *Autopatcher XP.* It combines all the available fixes and updates into an ISO file that you can run prior to connecting your PC to the Internet. Thus you're able to perform a complete install offline so your PC is up-to-date and protected before you venture onto the web.

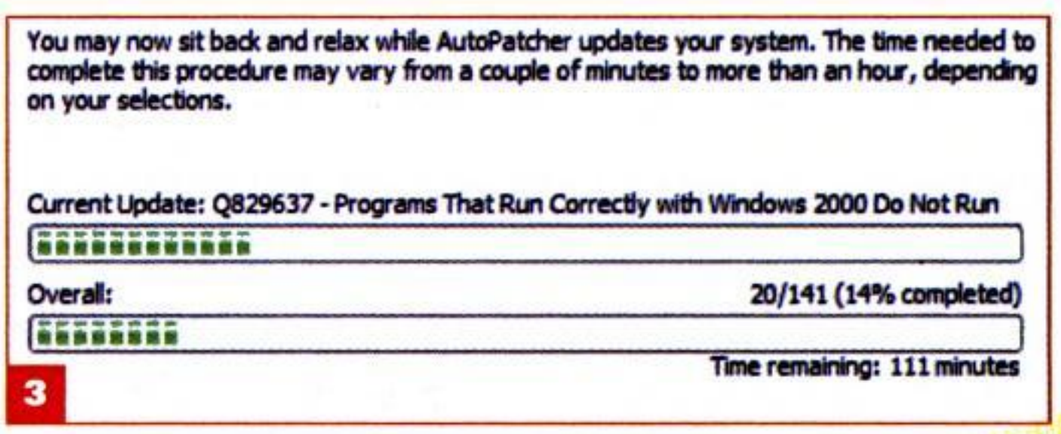
The only requirement for running this utility is that you have Service Pack 1 installed, so the best way to proceed is to download both SP1 and *Autopatcher* and burn both to CD, so you can update any PC with just one disc. When running, it works just like Windows Update, meaning it looks at your PC's Registry and presents a list of fixes that should be installed. Once you select the ones you want, simply run it and doggone it if your new XP install isn't up to date before you even hit the Information Super Highway's onramp. **Free, www.autopatcher.com**


neowin.net
AutoPatcher
official release
Welcome to AutoPatcher. We will update the following components on your Windows installation:
Microsoft Windows XP Pre-SP2 Patches
Microsoft Windows XP Pre-SP2 Patches - Critical
Microsoft Windows XP Pre-SP2 Patches - Recommended
Microsoft Internet Explorer and Outlook Express Patches
Microsoft Internet Explorer Patches
Microsoft Outlook Express Patches
Microsoft Windows XP Optional Tools and Components
Bootvis Tool (Version 1.3.37)
Allow Windows to keep hotfix backups for uninstall (Recommended)
Description: This will install the Recommended Windows XP Pre-SP2 Patches
141/245 Selected (Estimated time to install: 133 minutes)
Update
Save As Default
About
Exit
2

The program then presents you with a hierarchical list of recommended updates so you can choose which fixes to install.


Database Detection and Installation Options
AutoPatcher can detect hotfixes that have already been installed via the Registry. Also, AutoPatcher can deselect programs that have already been installed previously with another version of the program using Logs. AutoPatcher supports multiple Database Profiles as well. Please use the options below to choose how AutoPatcher will start.
Deselect items I have already installed (Log Detection)
Scan registry and deselect previously installed hotfixes
Choose Database: AutoPatcher XP Full
OK
1

Upon initialization, *Autopatcher* scans your Registry just like Windows Update does to determine what fixes your PC needs.


You may now sit back and relax while AutoPatcher updates your system. The time needed to complete this procedure may vary from a couple of minutes to more than an hour, depending on your selections.
Current Update: Q829637 - Programs That Run Correctly with Windows 2000 Do Not Run
Overall:
20/141 (14% completed)
Time remaining: 111 minutes
3

Now when you go online your PC is sound as a pound!

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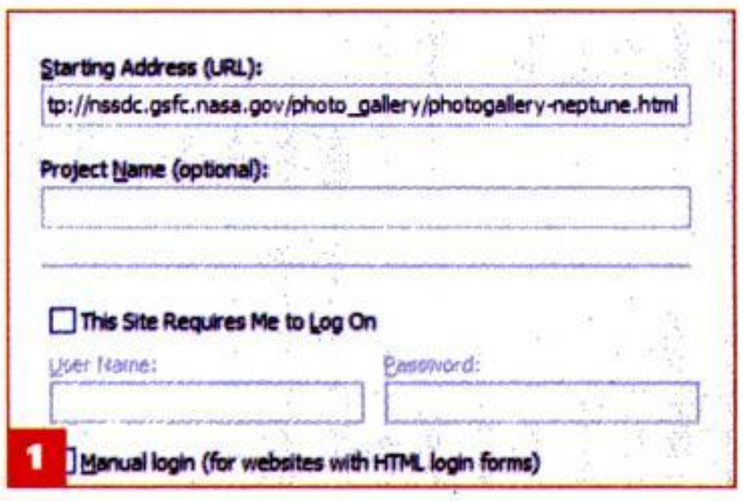
5. EXPRESS WEBPICTURES

EASILY EXTRACT A URL'S IMAGE ARCHIVE

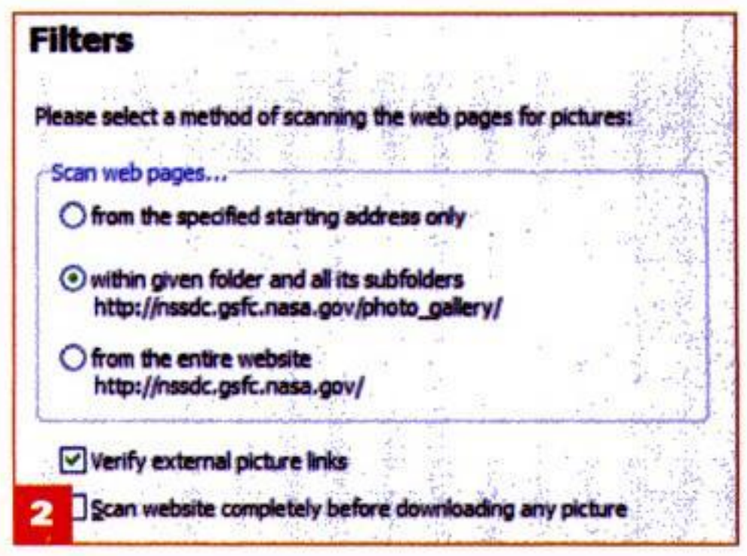
Whether you like to collect anime, 3D games, kitten pics, or some other class of digital imagery, we're sure you've experienced the hassle of wading through scads of thumbnails and then saving larger versions to a folder somewhere on your PC. This is why *Express WebPictures* makes us so happy. Simply point the application to a particular web site and like a giant binary vacuum it downloads all of the site's images and/or videos and deposits them in a file on your PC named after the URL. During testing we were able to downloaded 464 videos equaling 1.94GB from a "crazy video" archive on the net. You think you'd want to download that many videos manually?

You can start the app manually or leave it running in the system tray, which automates the process. Either way, you just have to start a new project, enter the URL, define the terms and types of files, and then let *EWP* do its thing. It notifies you when downloading is complete, and includes an image viewing program that functions similarly to *ACDSee*.

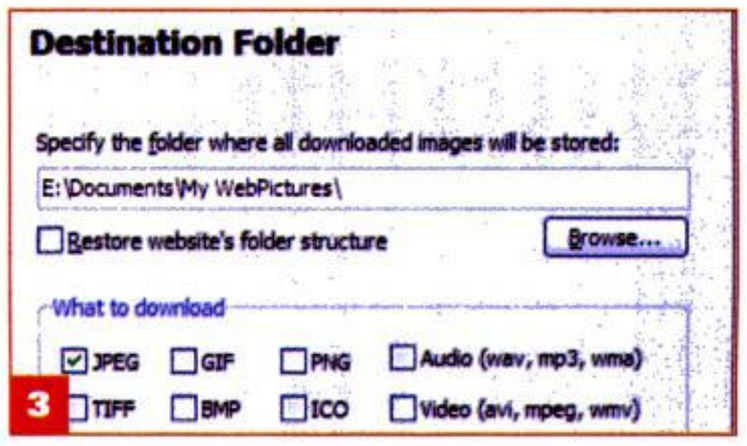
All in all, this utility is easy to use, blazing quick, and does an excellent job of organizing its tasks. It even works on password protected sites. **Free 30-day trial/ $40, www.neowise.com**



To get started, open the program and select New Project. Then simply paste the URL of the site from which you'd like to download and click Next.


Filters
Please select a method of scanning the web pages for pictures:
Scan web pages...
from the specified starting address only
within given folder and all its subfolders
http://nssdc.gsfc.nasa.gov/photo_gallery/
from the entire website
http://nssdc.gsfc.nasa.gov/
Verify external picture links
2
Scan website completely before downloading any picture

In the second step you can specify the extent of your download. Shoot, you can download *every* image on a site, if that's your fancy.



Finally, select the kind of files you'd like to download and put the utility to work. When the downloading is complete, you'll be notified. You can also browse the images in the utility's main interface area.

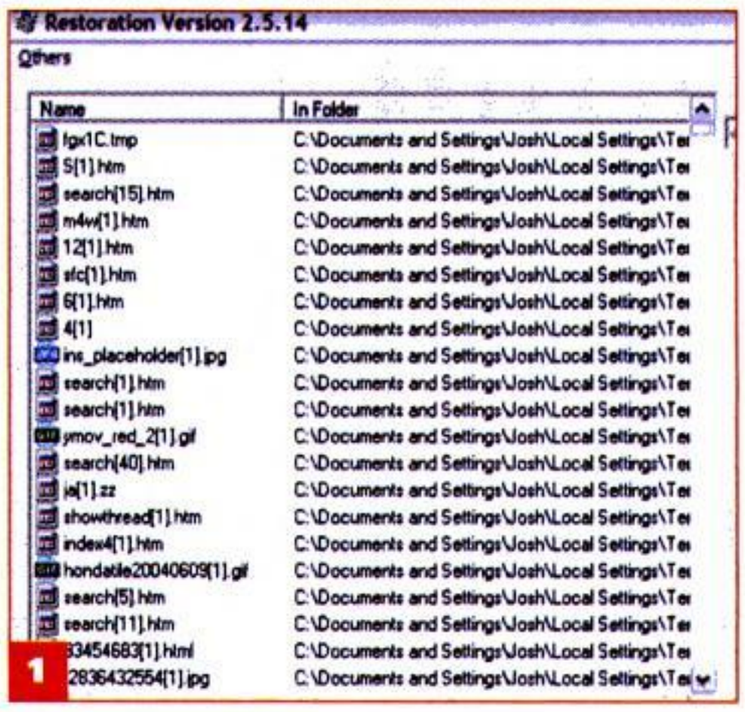
6. RESTORATION

DIG INTO YOUR RECYCLE BIN'S REFUSE

We've all experienced that sinking feeling upon realizing that a file we were looking all over for was in the Recycle Bin—which we just emptied! No worries. As you may or may not know, emptying files from the Recycle Bin merely removes any outward visual reference to them within Windows, but files still exist until they are overwritten by other files. Because of this, it's often possible to recover deleted files, and *Restoration* is the best utility we've found for the job.

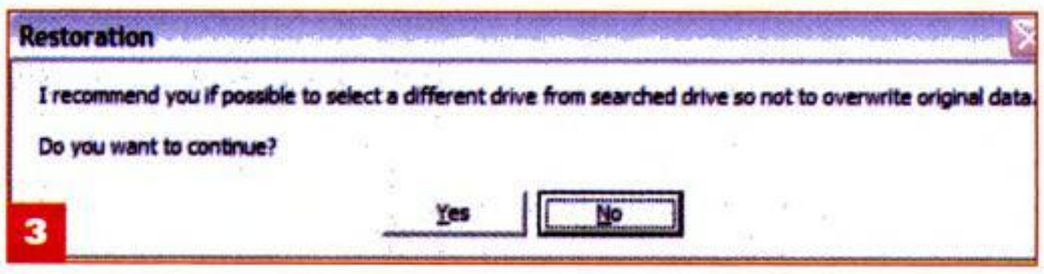
The key is to not lollygag. You have a much better chance of recovering a file if it's been recently deleted, simply because there's less chance it's been overwritten. Just select the drive the file was on and the utility will show you all the files that have been deleted, allowing you to restore the one you're looking for.

Other restoration utilities perform the same function, but they're either more difficult to use or cost money. *Restoration* is so effective because it cuts to the chase and gets the job done quickly.
Free, geocities.jp/br_kato



The restoration process begins by selecting the drive that housed the file you erased. In this screenshot, we selected C: and clicked Search Deleted Files.

Once we located our file, we clicked "Restore by Copying" and were prompted to save it to a location of our choosing.


Restoration
I recommend you if possible to select a different drive from searched drive so not to overwrite original data.
Do you want to continue?
Yes
No
3

You're discouraged from resaving data to the same drive from which it was deleted, but we had no problems doing so during testing.

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7. MP3 Album Art Downloader

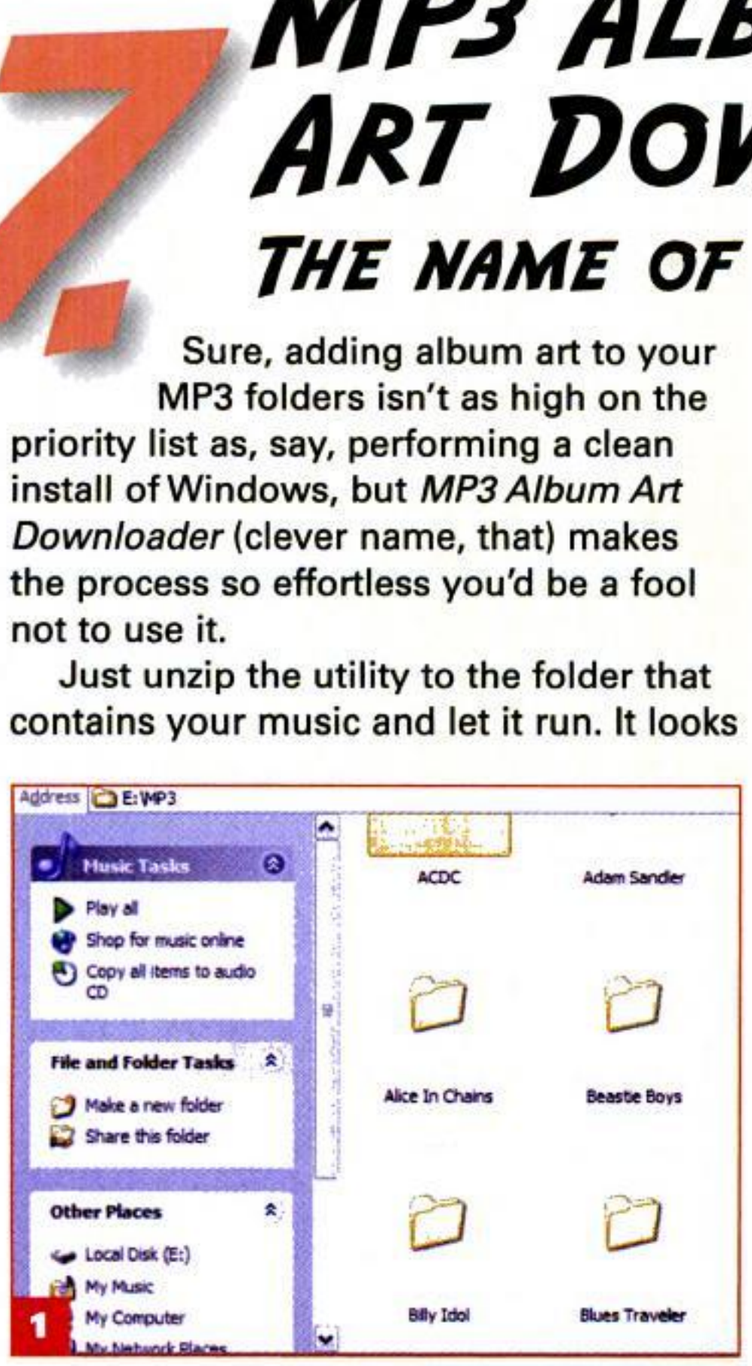
The name of the app says it all

Sure, adding album art to your MP3 folders isn't as high on the priority list as, say, performing a clean install of Windows, but *MP3 Album Art Downloader* (clever name, that) makes the process so effortless you'd be a fool not to use it.

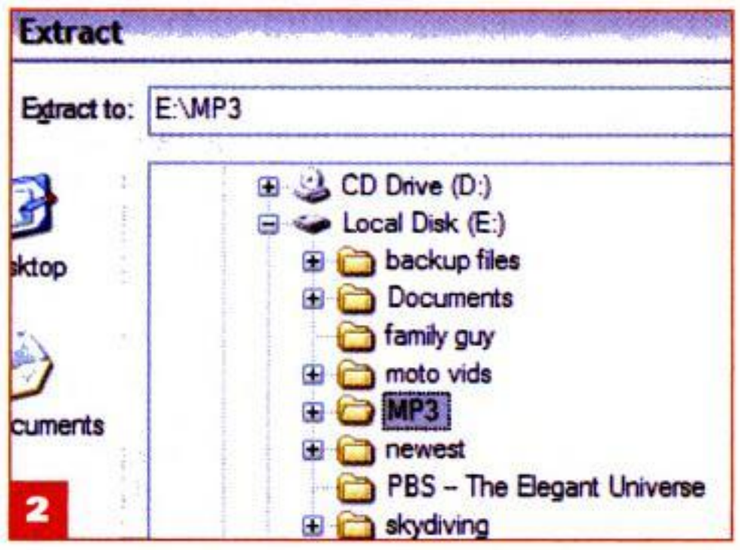
Just unzip the utility to the folder that contains your music and let it run. It looks at your music files, then zooms over to Amazon.com and grabs the associated album art, and then deposits the files into your music folder where it will show up in Thumbnail view. (Note: You must enable Thumbnail view for the images to appear). The only other way to perform this task is to do so manually, the tedium of which goes without saying.

Admittedly, *MP3AAD* isn't 100 percent perfect, and occasionally either misses folders entirely or downloads the wrong artwork. Still, its accuracy is good enough for us, and the time it takes to correct the mistakes is inconsequential given the time it saves in the first place.

Free, http://str8dog.com



This is what our music folder looks like before putting the utility to work. Those bland folders simply must go!



Once you've downloaded the *MP3AAD* file (or found it on the CD included with this magazine), just extract it to the root of your music folder. Next, simply open that folder and run the utility. It will automatically scan your entire collection and download all the attendant album art.

Voila! Our previously nondescript folders now look like miniature CD cases. It's an MP3 folder to be proud of!

8. Slimserver

Stream MP3s over the net

Streaming music over the Internet is nothing new, but *Slimserver* eliminates all the guesswork, which is why it's one of our newfound favorite utilities. You might be asking, "But *Maximum PC,* isn't that the software that comes with the Slim Devices Squeezebox?" Why, yes, yes it is, but you don't need the hardware to use the application! It'll work on any PC, and can be up and running in no time.

Install *Slimserver* on the PC that holds all your music. During installation you'll point the utility to your music folder and it'll catalog all of your music. Once installation is complete, simply run the application and it turns your computer into a streaming music server. Now, while using a different computer at, say, work or a friend's house, just launch the MP3 player and point it at the stream. Similarly, you can manage the playlists via any web browser. And all this functionality can be yours in just a few minutes, making it much easier to use than the streaming apps we've diddled with in the past.

Free, www.slimdevices.com

Welcome to Squeezebox - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://192.168.0.100:9000/
CNN.com
Welcome to Squeezebox
SLIM DEVICES
squeezebox
Browse Artists
Music Player
SKIP | PLAY | PAUSE | STOP
REPEAT: OFF | ONE | ALL SHUFFLE: OFF | SONGS | ALB
Squeezebox Home / Browse Artists / 80s - Kenny Logg
1 album with 1 song by 1 artist.
NOW PLAYING:
Footloose from Yesterday, Today, Tomarrow by 80s - Kenny Loggins
THE CURRENT PLAYLIST: SAVE | DOWNLOAD | CLEAR
Yesterday, Today, Tomarrow
Footloose from Yesterday, Today, Tomarrow by 80s - Kenny Loggins
3

We're up and running. The music on the host PC appears on the left side, and the current playlist appears on the right. It's so easy, anyone can do it!

Open URL
Enter the URL or path to a multimedia file on the Internet, your computer, or your network that you want to play.
Open: http://192.168.0.100:9000/stream.mp3
OK
Cancel
Browse...
1

Once it's installed on the host computer, just open the stream on a second computer by typing in the URL followed by ":9000/stream.mp3."

Next, pop open your web browser and type http://*youripaddress*:9000 to take control of the music. You can browse by artist, genre, and more, set up playlists, and stream music anywhere, even over a broadband connection.

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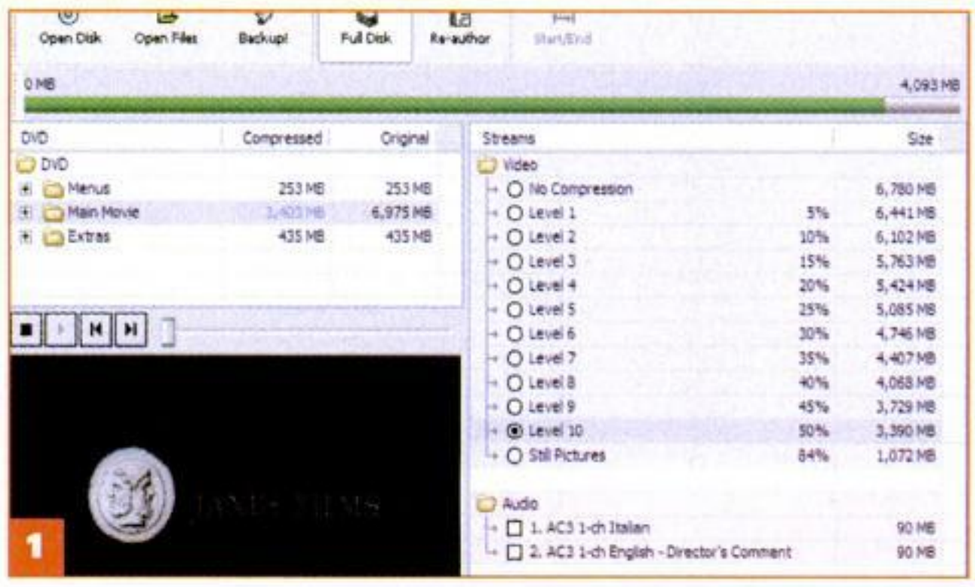
9. DVD SHRINK SQUEEZE COMMERCIAL DVDS ONTO A SINGLE DISC

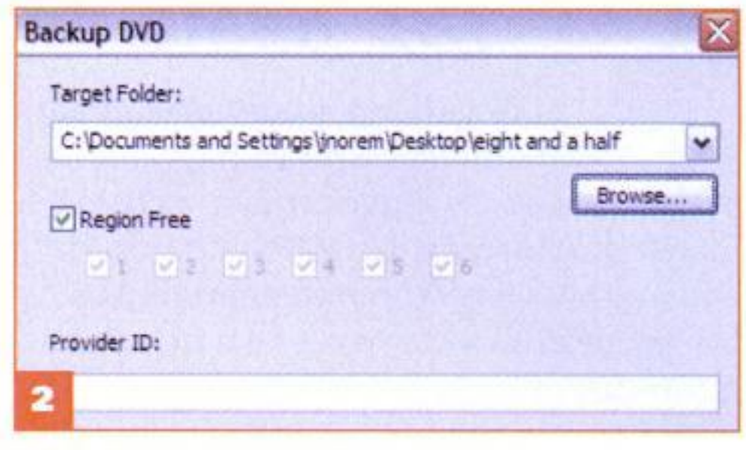
We've reviewed a lot of DVD backup utilities over the past year or so, but none are as handy as our freeware favorite, *DVD Shrink*. If you've ever tried to back up a DVD you own, you know how tricky the process can be. The average commercial DVD is an 8.5GB dual-layer disc, which means most movies don't fit on a puny 4.7GB DVD+R. (Dual-layer writable discs are just now becoming available and will alleviate this problem, but for now dual-layer burners and media are rare and pricey.) With *DVD Shrink*, though, you can remove all the unnecessary items from a DVD such as subtitles or the director's commentary, and then compress the remaining contents to a manageable size.



Once you start the utility, you will see the contents of your DVD. The main elements appear on the left (menus, movie, extras) with their contents on the right. Select what you don't want, and set the appropriate compression level.

We've sampled a lot of DVD backup utilities in our day, and *DVD Shrink* is by far the easiest we've used. Plus it's freeware and is regularly tweaked and updated by the author. It's one app we wouldn't want to be without.

Free, www.dvdshrink.org



Select a folder in which to save the final, compressed contents of the disc and click OK.

Once you've made your selections, run the utility to compress the video and save it to the designated file. You can enable Video Preview to watch the progress.

10. GSPOT CODEC INFORMATION APPLIANCE

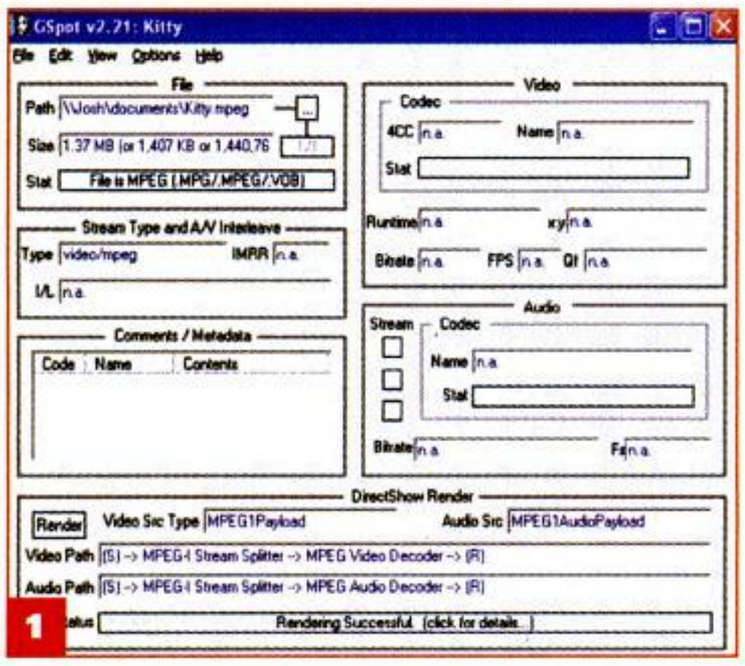
FIND THE CODECS YOU NEED TO PLAY DIGI VIDEO AND SOUND

There's nothing more frustrating than waiting patiently while you download a new video clip dubbed "The funniest thing ever!" by some message board maven, only to hit "play" and get just the sound, or worse, no video *or* sound. This is the tragic consequence of a missing codec. But how do you know which codec to add to your media player in order to play the video or audio (or both)? Enter *GSpot*.

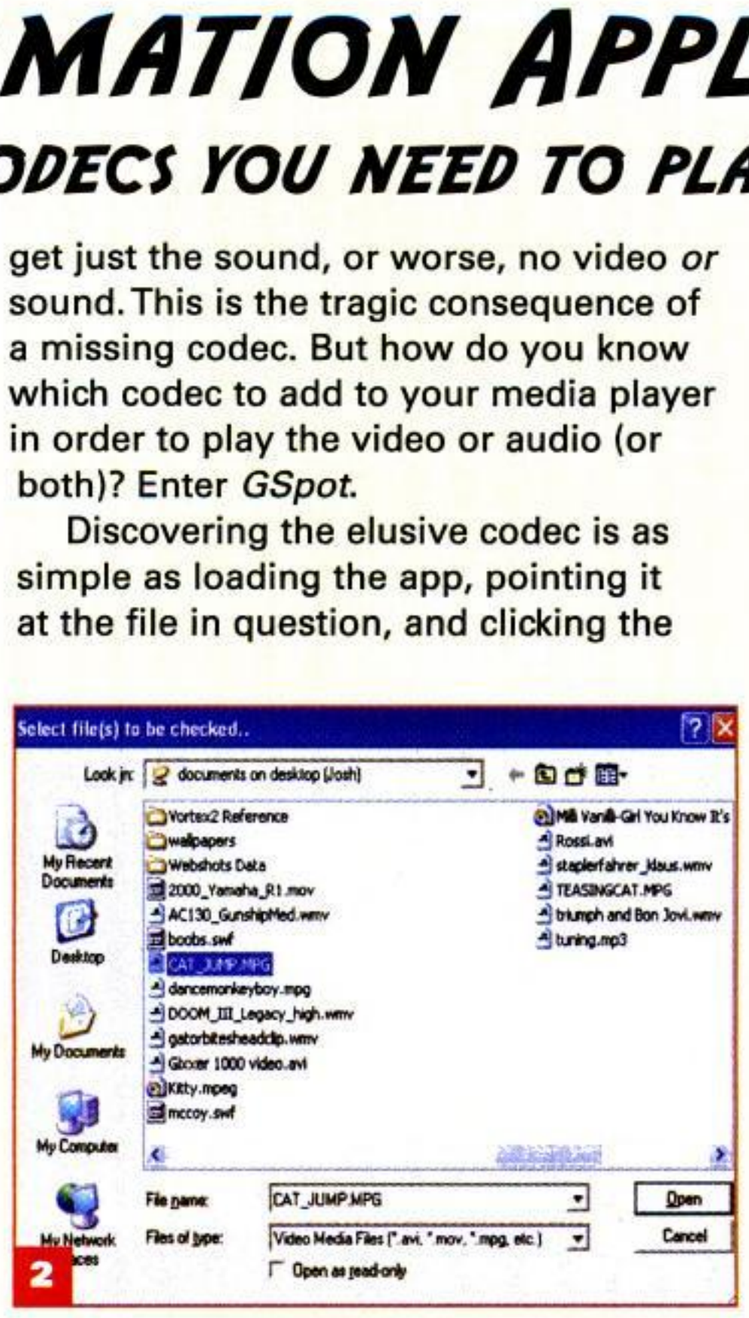
Discovering the elusive codec is as simple as loading the app, pointing it at the file in question, and clicking the render button. Mystery solved. This utility tells you the name of the codec being used for both audio and video. If it's unable to render the file, it tells you in plain English why.

GSpot gets our endorsement because it's the only utility we know of that performs this valuable function, and if an alternative does exist, we doubt it's as easy to use or as splendidly useful.

Free, www.headbands.com/gspot ■



This is the screen that appears once the utility loads. Click the "..." next to the Path bar to locate the file you'd like examined.



Next, select the video and click Open.

DirectShow claims to be able to play the file. The following combination of filters were used:
\\Josh\documents\CAT_JUMP.MPG (Source)
MPEG-I Stream Splitter (Splitter)
MPEG Video Decoder (Video Decoder)
Video Renderer (Video Renderer)
MPEG Audio Decoder (Audio Decoder)
Default DirectSound Device (Audio Renderer)
3

Finally, click Render and watch the results appear onscreen. If the rendering is successful (and it usually is), you can "click for more details" to find out everything you need to know.

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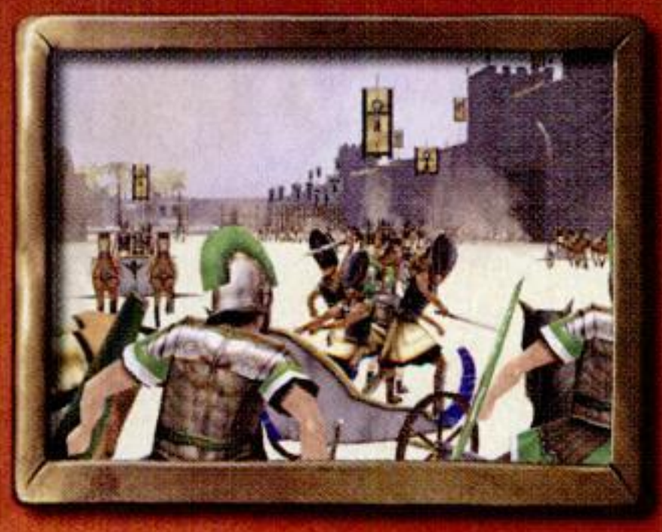
gamespy Best of E3 2004 Strategy Game of Show

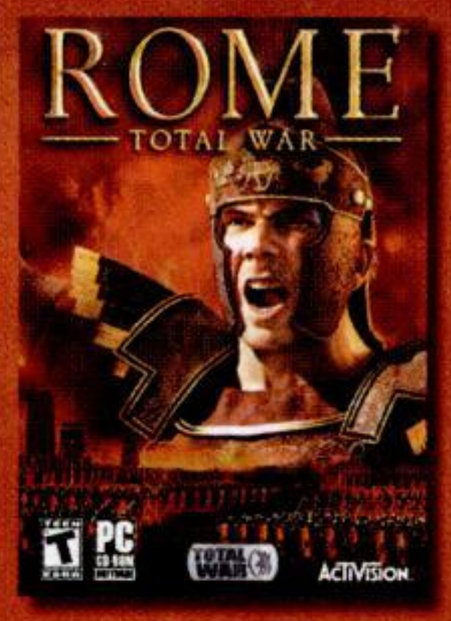
ROME™
TOTAL WAR



Carve your victories into history as you lead one of eleven old-world armies in epic, real-time cinematic battles.

Forge an empire on the revolutionary 3D campaign map with an intuitive display of your cities and armies.

Command unique units, from Carthaginian elephants and Scythed war chariots to Roman war dogs, using pick-up-and-play controls.



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PC CD-ROM SOFTWARE

TEEN
T
Violence
ESRB CONTENT RATING www.esrb.org

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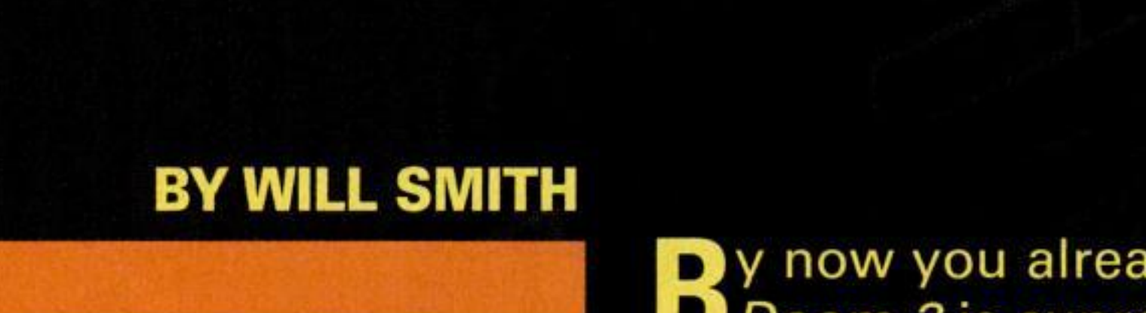
THE SECRET WORLD OF DOOM 3™

We explain how gaming's most sophisticated 3D engine works

BY WILL SMITH

By now you already know the obvious: *Doom 3* is supremely entertaining and represents a massive technological leap.

But how does the engine work? And how will it run on your system? In a brazen effort that justifies the countless hours we've spent playing one of the year's biggest games, *Maximum PC* explains it all in exquisite technical detail!



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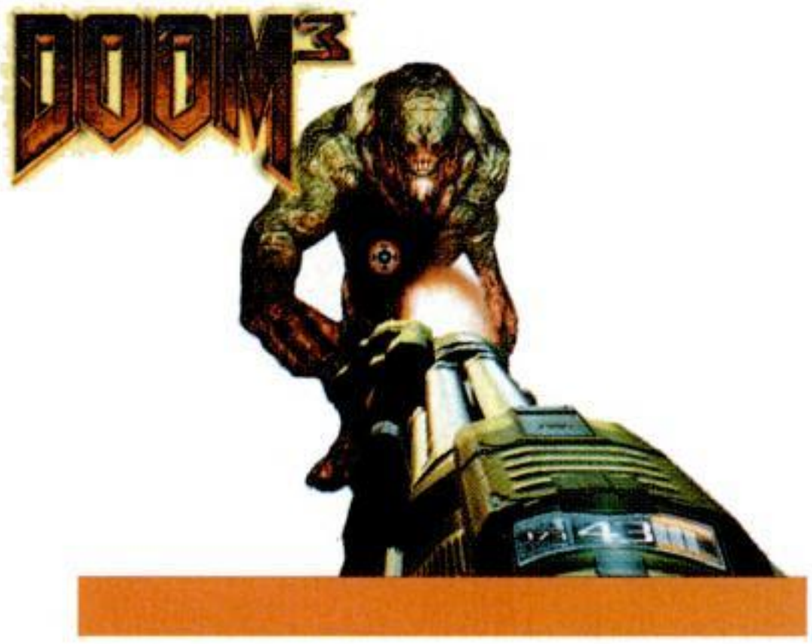


Without a doubt, *Doom 3* is the most technically advanced PC game ever built. From the revolutionary graphics engine to the hyper-realistic physics model, the game surpasses all others in its real-world mimicry—if you call a demon-infested base on Mars the real world, that is.

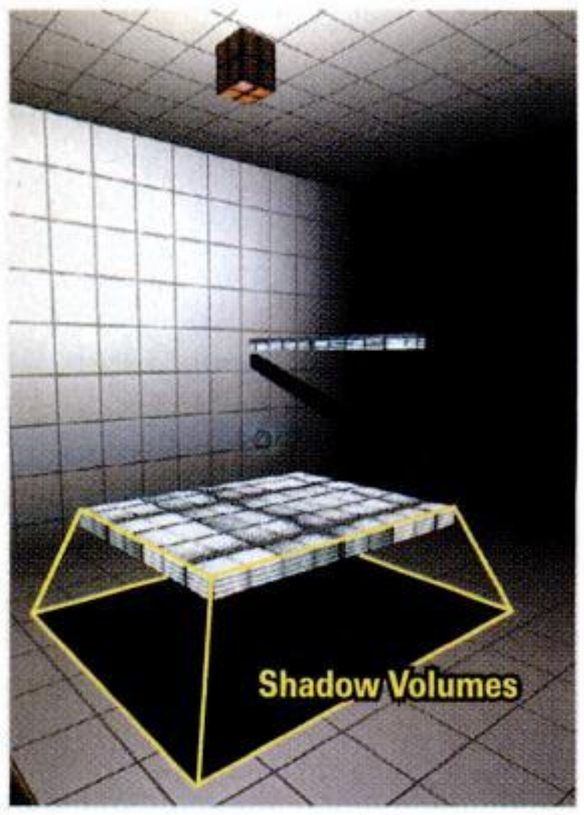
What's really amazing about id Software's tremendous effort isn't the raw power of the engine, or the incredible amount of art that was created for the game, or even the hyper-realistic shadows. No, what amazes us is the wide spectrum of hardware that the game actually runs well on. You can run *Doom 3* on hardware that's positively ancient by *Maximum PC* standards and still get decent frame rates. Granted, you're not going to be able to run it with all the whiz-bang features turned on. In fact, you won't be able to experience many of the most visually impressive effects. But at least you'll be able to play.

Before we jump into our review of *Doom 3* the game, let's deconstruct every single aspect of the astounding engine powering it. Follow along and we'll tell you exactly how it all works.

You Can See Your Doom Coming

The most discussed aspect of *Doom 3* is John Carmack's very next-gen graphics engine. Making full use of the latest in programmable shader technology, *Doom 3* stresses the hell out of any videocard—from ancient, barely supported GeForce4-era cards to the latest, greatest Radeon X800 and GeForce 6800 boards, which can't even run the game at its highest possible detail levels. What requires all this pixel-processing power? Shadows and normal maps.

The secret to the game's verisimilitude is its hyper-realistic lighting model, courtesy of stencil shadows. Drawing stencil shadows is easy—the hitch is that it places a tremendous



In this very simple map, we can see some basic shadows. The invisible shadow volumes fill the area between the white platform and the floor (outlined in yellow). *Doom 3* draws shadows anywhere those volumes intersect polygons.

The cacodemon's energy weapon creates a space- (and mind-) bending effect on impact. The secret? Two words: programmable shaders.

Lab Tests: How Will Doom 3 Run on My Computer?

Not sure your PC can pass muster for *Doom 3*? It's time to find out—we ran a battery of Lab tests to find out which components work, and which components don't

To determine what hardware works best in *Doom 3*, we performed three rounds of tests. First, we tested videocards to see exactly how fast different generations of hardware could run *Doom 3*. To keep everything even, we tested three GeForce videocards in our Athlon FX-51 zero-point rig: an old GeForce4 MX 460, a GeForce4 Ti 4600, and a GeForce 6800 Ultra, as well as a Radeon 9800 XT. We tested the 6800 and the 9800 XT in high-quality mode at 1280x1024 with AA disabled, the 4600 board at 800x600 in medium-quality, and the MX board at a pokey 640x480 in low-quality mode. (If you're interested in seeing how *Doom 3* looks on different generations of graphics hardware, turn to page 62.)

Second, we wanted to find out how dependant *Doom 3* is on CPU speed and type, so we tested it with three different CPUs: an Athlon XP, a Pentium 4, and an Athlon FX. All the CPU tests were run with a GeForce 6800 Ultra card, to isolate the variables as much as possible. The results surprised us, and they'll definitely surprise you, too.

Finally, we dug up three systems from our vault to see how *Doom 3* handles a variety of hardware. The three test systems—a Pentium 4 2GHz with 512MB of RAM and a GeForce3, an Athlon XP 3200 with a 1GB of RAM and a Radeon 9800 Pro 256MB, and an Athlon FX-51 with 1GB of RAM and a GeForce 6800 Ultra—represent state-of-the-art hardware from more than two years ago, one year ago, and the present, respectively.

We measured frame rates by running the *demo1* using the initial release of *Doom 3*. To test your own rig, open the console by pressing Ctrl+Alt+~ and then type "timedemo demo1."

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burden on your system's videocard and CPU. Let's take a look at how stencil shadows (sometimes called shadow volumes) work so you can understand why drawing them is so hardware intensive.

Check out the screenshot on the preceding page. The red cube represents a light source. The area under the cube should be lit, but there's a platform between the light and the floor. You know the area under the platform will be shadowed, but how can you describe this in a simple computer program? It's easy. Think of the light as being the apex of a pyramid and the four edges of the platform's top as lines that intersect the pyramid's four walls. The area inside the pyramid will be illuminated, except for the area beneath the platform, which will be shadowed.

This is precisely how *Doom 3* handles shadows. In our pyramid example, the engine actually draws an invisible polygon where the shadow appears. The engine draws shadows on any object that enters the invisible volume polygon. The trick is that *Doom 3* draws these invisible shadow volumes for every light source and every object in the game. Even with just two or three light sources, the number of invisible polygons quickly gets out of hand—they may be invisible, but they still consume precious GPU resources. Considering that everything from the swinging light to the muzzle blast of your shotgun is a light source, that's a lot to draw.

One clever advancement found in *Doom 3* is interactive, in-game GUIs that are similar to Flash animations. When you approach one, your weapon drops and is replaced by a cursor that lets you punch in codes as if you were standing in front of the terminal.

Do I Look Normal to You?

Dynamic shadows don't account for all of *Doom 3's* eye candy. Normal maps are also used to add an extra level of detail to the character models and lots of the game's surfaces. Here's how they work.

Bump maps have been used in games for a long time now. They're nothing more than simple grayscale textures that encode the height of each pixel on the texture. When applied to an otherwise flat surface, they convey the illusion of depth. However, bump maps have a problem. Because they only modify the height of a flat surface and don't actually modify the geometry of the surface, collision and clipping problems occur when you use bump maps on polygons that move—like the polys in a human face.

The solution to this problem is the normal map, which contains not only the height of each individual pixel on the base surface, but also encodes the direction that each pixel is facing. With this information, a modern GPU can actually draw the model with the extra polygons described by the normal map, and clipping and polygon collision are no longer a problem. Game designers can create a model with millions of polygons, then run it through a filter in their 3D modeling software that will convert the high-poly model to a low-poly model and a normal map. In *Doom 3,* normal maps and 6,000 poly models are used to draw monsters that appear to have all the complexity of the high-res originals!

Oh Shaders, How I Love Thee!

The final stroke in the Carmackian trifecta of 3D engine design are the dozens of little shader effects strewn liberally throughout the game. The shockwave effect that occurs near a rocket or grenade explosion, the shimmer of heat around steamy pipes, and the melting-away that claims so many corpses are all created with simple pixel and ver- ➔

VIDEOCARD TESTS

GeForce 6800 Ultra (1280x1024 HQ)	81.1 fps
Radeon 9800 XT (1280x1024 HQ)	33.0 fps
GeForce4 Ti 4600 (800x600 MQ)	30.0 fps
GeForce4 MX 460 (640x480 LQ)	13.4 fps

As you can see, there's a huge performance difference between the old, fixed-function GeForce4 MX card and the state-of-the-art 6800 Ultra. Not only do you get a massive performance increase, you also run at a much higher quality level, with high resolution textures and much more nuanced shadows. The Radeon 9800 XT performed well, but the eight-pipeline card couldn't keep up with the 16-pipe 6800.

CPU TESTS

Athlon FX-51	81.0 fps
Athlon XP 3200	64.4 fps
Pentium 4 2.0GHz	33.4 fps

The results of the CPU tests are quite surprising. The Athlon XP—an underperformer by today's standards—performs admirably. It's able to keep up with the CPU-heavy physics and sound engines, unlike the slow 2GHz Pentium 4 we tested.

SYSTEM TESTS

Athlon FX-51, GeForce 6800 Ultra	81.0 fps
Athlon XP 3200, Radeon 9800 Pro 256MB	48.8 fps
Pentium 4 2GHz, GeForce3 Ti 500	25.1 fps

What's surprising is that the high-end system is nearly twice as fast as the mid-range rig. The lesson is one *Maximum PC* has preached for years: New hardware gives you a huge performance boost, even compared with a system that's only about a year old.

This means that, in order to get the most *Doom 3* performance for your buck, you should: upgrade your videocard first, your CPU second, and your memory third. You should also remember that pairing an uber-powerful videocard with a slow-ass CPU will limit your in-game performance, although not as much as we would have expected.

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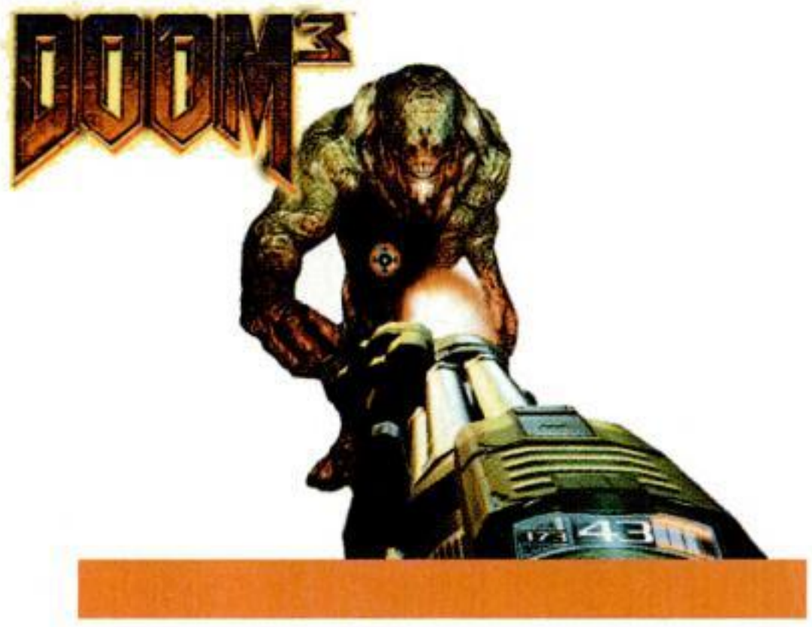


tex shader programs: small programs that can modify data at different points in the 3D pipeline. Readers familiar with previous *Maximum PC* articles on 3D engines, listen up: We told you that programmable shaders could result in more than fancy-looking water and waving grass!

Physics

It's fairly obvious that realistic physics modeling is one of the next major frontiers in game design. Nearly every game available today—from first-person shooters to real-time strategy games—uses some form of physics engine. In making *Doom 3,* id Software chose to create its own, rather than using a popular off-the-shelf physics engine like Havoc or MathEngine.

Doom 3's physics engine doesn't push the envelope in a big way—it doesn't really distinguish itself from middleware physics engines—but it at least delivers everything we've come to expect from Havoc-based games, including ragdoll physics that produce incredible dynamic death animations, realistic fire physics, and many of the weapon effects. Note that the in-game physics in *Doom 3*—like most other games that claim "real-physics"—are in fact approximations of real-world physics calculations. Don't use *Doom 3* to model your senior thesis, physics students.

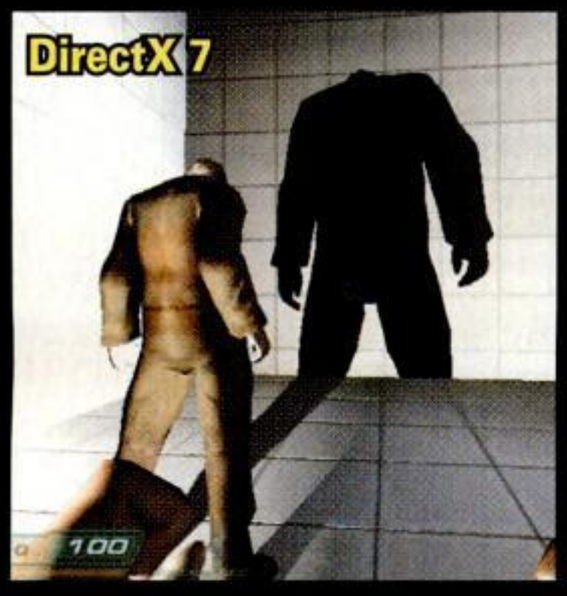
Can You Hear Me Now?

Doom 3's sound engine has been the subject of much controversy. Unlike most games' sound systems, *Doom 3* shuns the Windows-only DirectSound API in favor of a more general, host-based approach. Performing all the 3D sound calculations on the CPU offers several benefits: The game isn't hindered at all by the limitations of DirectSound, and the developers can programmatically modify in-game sounds. In addition to creating a variety of sounds for each type of object—some bullet impacts have *seven* different sound variations—the engine can also modify sound

But How Does It Look on My GeForce MX?

We show you how *Doom 3* looks on a variety of videocards

In a laudable move, id programmed *Doom 3* to run on hardware that predates the millennium. We're talking GeForce3s here, people! This made us wonder: What's the trade-off in visual quality as you step down in GPU technology? To answer the question, we ran *Doom 3* on several different videocards.



Here, using the GeForce4 MX, the weaknesses of a fixed-function pipeline card are readily apparent. Look at how blown-out the light on the left wall is, and notice the low-resolution textures on the zombie's back. Detail is sacrificed to accommodate a mere 64MB of video memory.

For the purposes of our tests—to best demonstrate the difference between videocards—we custom-built a basic *Doom 3* map with a few enemies and some dynamic lights. This shot was taken at the High Quality setting on a DirectX9-class nVidia GeForce 6800 Ultra card with 4x AA turned on. Note the smooth, rounded shadow edges and the different shades of dark inside the shadows.

Our pal the spider looks pretty good with a DirectX 8-level card, such as the GeForce4 Ti. The only difference between it and the DX9-level spider is the lower-resolution textures required by the 128MB card.

Using the GeForce4 Ti card, the zombie looks almost the same as with more powerful DirectX 9 cards. However, we had to turn off antialiasing to improve performance.

The spider produced by the DX7-level card—a GeForce4 MX—is not a pretty sight. His shadow is very simple, and the shadows don't interact. Note that there are no shades of gray in his shadow—the floor is either entirely black or its normal color.

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on the fly using small sound shaders. We've heard id uses sound shaders to create even more variation in the frequently repeated sound effects.

The result is that playing *Doom 3* with an above-average 5.1 speaker rig is truly a religious experience. You hear the world come alive all around you. We frequently heard audio cues in the game that gave us advance warning of some hellspawn's ambush, and the creepy-crawly tip-tip-tap of the spider demons still gives us chills. ■

Doom 3: The Maximum PC Verdict

Our take: A huge leap for 3D engines is just a small leap for the FPS genre

One week prior to *Doom 3's* release, it felt like the night before Christmas at the *Maximum PC* office. We all upgraded our rigs with beefier processors and next-generation videocards. And with everything benchmarked and thoroughly broken in, we went to sleep each night with visions of imps and cacodemons dancing in our heads.

Once the game arrived and we began playing, we were overwhelmed by mixed emotions. Indeed, *Doom 3* looks absolutely amazing, and we're pleased to see a game actually justify the immense amount of time we've spent upgrading our systems. On the other hand, while it's extremely scary at times, the gameplay follows a basic formula that consists of wandering through dark hallways while enemies teleport into the room when you trigger invisible switches. This pattern repeats itself throughout the game's 20-odd hours of gameplay, and because the enemies use the same attack methods, the only thing that really changes is the teleport locations. This "surprise!" formula goes from surprising to annoying real quick.

Despite its repetitive nature, combat still feels satisfying and, like the game itself, is easily the most intense action we've experienced on a PC in a long time. The sensation of the weapons combined with almost-nonstop action and 5.1 surround sound put you right in the middle of a scarily realistic environment. And although you fight the same enemies over and over, the tension persists as baddies leap out at you from behind closed doors, claw at your face, and scream and writhe as you send them back to hell.

There's a story in the game, but unfortunately you're forced to read about it in e-mails you find on dead bodies, which consequently brings the game's frantic pace to a crashing halt. While it's nice to see an id game with a story, we can't help but deem this a pretty lazy way to drive a plot.

Multiplayer is also included, but out of the box, it's a half-baked affair. Matches are limited to four players per map, and only five maps are included. As of this writing, we've encountered several bugs in the process of joining online servers. But when we could connect, we had a blast. The action feels as fast, furious, and nail-biting as it did back in the old-school days of original *Doom*.

And yet, despite all its flaws, we simply could not stop playing the single-player campaign. If it weren't for our sore necks and frazzled nerves, we would have finished it in our first sitting. *Doom 3* is clearly the best single-player game id has ever made. It's just too bad the game doesn't bring as many new ideas to the FPS genre as it does to the world of 3D rendering.

—JOSH NOREM

Unfortunately, *Doom 3's* AI is pretty basic—monsters use the same attack methods every time you encounter them.

MAXIMUM PC VERDICT 8

+ DOOM

Incredible graphics, intense action and fun weapons.

– GLOOM

Gameplay is repetitive and feels dated, very basic multiplayer, and plot revealed through e-mails.

$55, www.doom3.com

Doom 3 Tweaking Tips

Maximum PC presents 7 quick tips for maximum performance

➤ Enable triple buffering in the OpenGL control panel of your videocard's display properties. This will give you better visual quality with no loss of frame rate.

➤ Fix the game's nasty visual tearing and corruption by enabling VSync in the "advanced" video options. Even if you have it enabled in your videocard settings, the game can overrule this setting, so it must be set in-game.

➤ If you are running dual displays, killing the second monitor when firing up *Doom 3* will drastically increase your frame rates.

➤ Download the latest drivers for your videocard. As an example, Lab testing has shown frame rate improvements ranging from 10 to 20 percent using the beta 4.9 Catalyst drivers.

➤ Open the console (CTRL+ALT+~) and type "r_gamma 1.3" This cranks up the gamma a smidge, making the game appear crisper and a touch brighter, but still keeps it dark enough to remain consistent with how it's supposed to look.

➤ To run the included *Doom 3* benchmark, open the console and type "timedemo demo1" and be sure to run it twice, ignoring the first score.

➤ To enable the frame counter open the console and type "com_showfps 1".

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Ask the Doctor

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NO MORE FLOPPIES

Have we come to the point where a PC can be built without a floppy drive? I want to build an Athlon 64 system housed in Antec's Aria SFF case, but I'm wondering how I would apply BIOS updates and the like without a floppy drive. Can I use a USB key drive or a CF card instead?

—DAVID ROWELL

First, you can indeed build a PC without a floppy drive (even with RAID support, if you read this month's how-to section). But if the motherboard you use requires that you boot to a floppy to update the BIOS, your hands are tied. Most modern motherboards support Windows-based BIOS updates though, and some also have the software to rewrite the BIOS installed in the motherboard. But even if you're dependant on a floppy, it needn't dictate the makeup of your PC. You could simply use a USB-based floppy to boot (for some motherboards only), or you can just keep a floppy drive loose on a cable in your tool kit. When you have to update the BIOS, just crack the case open, plug in the floppy and run the update.

WAITING IS THE HARDEST PART

I have a quick question for you: How much longer will it take for things like DDR2 and PCI Express to arrive? I'm interested in building a new system and want to integrate these new technologies, but I want to know how long I'll have to wait.

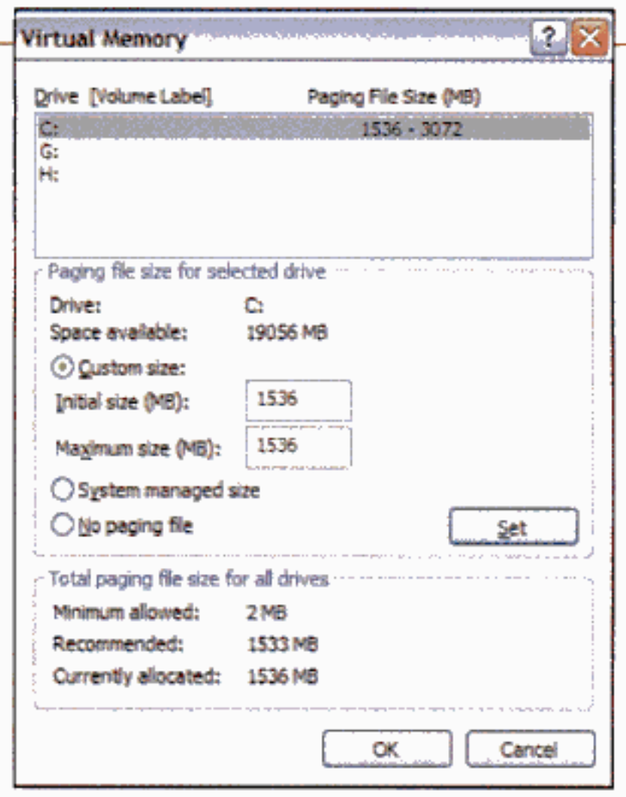
—SPC ANDRES D. HUNTER
10TH MOUNTAIN DIV, IRAQ

The wait is over. DDR2 and PCI Express motherboards for Intel CPUs should be on the market by the time you read this. AMD CPUs supporting PCI Express aren't expected for another month or two. AMD has also been mum about its support for DDR2, but the Doc believes AMD is just waiting for higher-speed grades of DDR2 before it supports the new memory standard.

DEFEATED BY DEFRAGGING?

I feel I do a pretty good job of taking care of my computer. In particular, I've scheduled a daily defragging of my hard drive to keep all my files nice and tidy on the disk. I've noticed, however, that the more often I do that, the further out the paging file seems to move. Because the drive performs best near the center, wouldn't this hurt my performance? It would seem I'm defeating the purpose of defragging if the page file gets moved further and further out. Is there a way to reverse this problem? Should I defrag less often?

—DANIEL WONG



By default, the Windows' page file constantly grows and shrinks to suit its needs. This results in fragmentation of the page file as well as files in its proximity.

Frequent defragging isn't harmful to your drive, so defrag as often as you like. As far as the page file is concerned, this is something of a can of worms, so we'll take it one issue at a time.

First, when you defrag within Windows, the page file is not defragged, because the page file is locked by Windows while the OS is running. The only way to defrag the page file is to use a third-party app like *Diskeeper* (www.executivesoftware.com) and to select a boot-time defrag, which defrags the page file prior to loading Windows. Interestingly, *Diskeeper* doesn't touch the page file during normal, in-Windows defrags, but during boot-time operation it moves the page file to the front of the drive platters. Also, according to *Diskeeper* the difference in performance between a page file residing at the front, center, or end of a drive's platter is negligible, at best.

So even though the page file isn't being moved by the defrag software, it's still possible the page file could move slowly across the drive if it's constantly being expanded and then compacted by Windows. This happens because by default Windows has a minimum and a maximum value to use for the page file, and as it swaps content in and out of this area the size dedicated to this process expands and then shrinks, which can lead to the page file moving across the drive like a snail.

To thwart this process, you need to specify the same amount of storage space for both the minimum and maximum amount of space to be used for the file by doing the following: Right-click My Computer, select Properties, Advanced, and then under "Performance" select Settings, Advanced, and under "Virtual memory" click the Change button. Then simply enter the same value for the maximum and minimum (between one and a half and two times the amount of system memory is ideal) and click "set." This is actually a pretty good practice for anyone, as it prevents the page file from getting fragmented in the first place.

LYING DOWN ON THE JOB

Doctor, I have a system in a tower case and I want to know if I can lay it on its side and run it that way. Can I damage my system by doing this?

—ISSAC SMITH

In the 1980s, conventional wisdom held that you should format the hard drive in the position the system would be used in. If you, say, kept your tower on its side, you were supposed to reformat the drive in that orientation. Whether that was true or not, today's hardware has no such restrictions that the Doctor knows about. You should be fine, assuming you're not blocking any vents and your optical drives are capable of being run on their sides (even so, you may get a few more scratches on optical discs from spinning down with the optical drive on its side).

FAN-TASTIC QUESTION

The article about the 15 common PC upgrade mistakes in your July issue was very helpful but I had a question about mistake #11: How can I tell if my case fan is facing the wrong way? Should certain fans direct airflow in certain directions or does it not matter?

—RICH FLOYD

Generally, you want a well-designed airflow plan. For most ATX cases, the conventional wisdom has been to suck air in the front and blow it out the back. You want as much air as possible moving through the case to keep your hardware cool. If your system is running too hot and the CPU is overheating, you should consider reversing the airflow so you suck cool air in the rear so the processor gets the coolest air possible. You should then vent air out the front of the machine.

SOME SOUND ADVICE

I'm obsessed with high-quality sound and recently bought a

new pair of speakers that are absolutely great, but the problem is that when I play my MP3s the sound crackles and pops. I think the culprit might be the onboard RealTek AC97 on my motherboard. Is there anything I can do to fix the problem? I'm on a tight budget so I'm hesitant to purchase a stand-alone soundcard, but if I'm forced to go that route, are there any quality, value-priced 5.1 channel soundcards out there you could recommend?

—MARCEL DORMA

You should have no problems playing MP3 files on a properly configured system, even if it's using lowly onboard audio. The crackling is likely the result of a device that's hogging the PCI bus. You may first want to check your device manager to see if everything is configured correctly and there are no conflicts. You may also want to try removing your PCI cards (NIC, RAID, modem) to see if that clears up the problem. Of course, also make sure you have the latest drivers and BIOS for the motherboard and sound device. And get the latest drivers for all your hardware devices (NIC, RAID, modem) as that may correct any problems. Finally, if you're really into high-quality sound, you shouldn't be running onboard audio. Consider Creative Lab's Audigy 2 ZS (about $85) or M-Audio's Revolution 7.1 card (about $75.) Both feature high-quality 24-bit components and because they're off the motherboard, they're less prone to the noise that most onboard AC97 components demonstrate.

DEFRAGGING RAID

I've got two Western Digital Raptors in a RAID 0 configuration and was curious as to how defragging affects performance. Whenever I have the defrag utility analyze my C: drive, there's always an inordinate amount of info on the latter half and I want to know if the cleanup process sends all the data to a single drive, negating the benefit of splitting the labor, or does it clean everything up and keep data spread across the two drives?

—MIKE FONTANA

A RAID array is effectively a single drive as far as your defragmenting software is concerned, so we recommend treating it just like a single hard drive and defragging relatively often (at least once a month). When you perform this task, the software treats the two drives' data stripes just like bits of data on a single drive and rearranges them in order to be as contiguous as possible for optimal performance. We're not sure what's causing you to think most of the data is residing on only one drive, but that would never happen with a RAID array and is physically impossible because RAID striping works by dividing data into blocks and divvying it up between the two drives. In RAID, data is always spread across both drives by the RAID controller.

On a semi-related note, be very careful running RAID 0 because it doubles your chances of suffering drive failure and losing all your data. In general, you should never keep anything on a RAID 0 array that you would mind losing.

TO RAID OR NOT TO RAID

I've recently gotten into video editing and now want to upgrade to a dual SATA drive configuration. Everything I read about video editing says the ideal situation is to have two hard drives with the OS loaded on one drive and the video files on another. How does this compare with a RAID 0 configuration that has two (or more) partitions?

—FRED WILSON

Because you're doing video editing with your PC, a RAID 0 configuration is ideal for this purpose. As you are probably aware, streaming video requires some serious horsepower, especially if you're trying to render multiple streams at once. If your hard drive can't write as fast as the speed of the incoming video stream, the result is dropped frames, gaps in audio, and jerky performance. This scenario is highly unlikely in a RAID 0 setup, as both drives can handle an obscene amount of bandwidth (more than 100MB/s sequential reads for late-model hard drives!) and are thus totally capable of handling any major spikes in throughput as well as multiple streams simultaneously. The only problem with the RAID 0 approach is it doubles your exposure to catastrophic data loss, so you'll need to run frequent backups.

UPDATING DRIVERS AUTOMATICALLY

Do you know of a way I can automatically detect the hardware in my system and locate the correct or updated drivers for the components? I recently reformatted my hard drive to reinstall Windows 98 and it's a pain to have to hunt down the drivers I need.

—TODD

That would sure be swell, wouldn't it? Unfortunately, we know of no such beast, and we'd be very cautious if we found someone advertising such a service. A site that would install new drivers when Windows is freshly installed could also install all sorts of nasty malware when your computer is at its most vulnerable, before the firewall and antivirus software are onboard. ■

HARD OF HEARING

I jog regularly in Central Park and always take some music along to keep me going, but the volume levels are never loud enough. I've tried using both an MP3 player and my Samsung SPHi-700 phone. I have tried to enhance the audio levels of my WMA and MP3 files via *MP3Gain* but the audio becomes static or noisy. Is there a way for me to enhance the audio level of a song without distorting it?

—ALEX

In a word, no. MP3s, as you probably already know, are compressed by throwing out a certain amount of audio data in order to reduce the file size. You can use a program like *MP3Gain* to increase the volume a little bit, but you can't crank an already compressed file to Dr. Feelgood levels without some consequences.

You have some options, though. You can rip your CDs over again and use an audio-editing application to increase the volume of each track (look in the Help file for "volume increase" or "gain" control) before compression. But that's a drag.

You can also buy better headphones. Sony's MDR-EX70LP and MDR-ED268LP series earbuds ($50, www.sel.sony.com) pump incredibly juicy bass from even weak-sounding, poorly compressed tracks, while remaining light enough to be comfortable for jogging. Even better, Shure's E3c earbuds ($100, www.shure.com) provide a better fit, blocking out more outside noise and thus reducing the amount of volume you need.

You also have the option of buying a louder MP3 player. The iPod gets brutally loud (fun fact: European iPods are quieter, for sensitive European ears). And if the iPod still isn't loud enough for you, crank it up with *euPod*, a third-party hack available for free at www.espen.se (keep in mind that there's an inverse relationship between volume and battery life).

There's no easy way to increase the volume of your MP3 files, but you can get a louder MP3 player. The iPod is one of the loudest players we've ever tested.

Finally, you could go get a hearing exam at the free clinic.

Is your Dream Machine turning into a nightmare? Are you waking up in a cold sweat because your PC can't cope with today's hardware? Look to the west, my sons and daughters, for the Doctor is here to save you. E-mail all your PC problems to **doctor@maximumpc.com**, and if your problem is dire enough, the Doc will come to the rescue.

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How To...

A step-by-step guide to tweaking your PC Experience

UPDATE YOUR Windows XP CD

Add RAID drivers and Service Pack 2 to your original Windows CD!

By Omeed Chandra

MAXIMUM PC
TIME TO COMPLETION
2:30
HOURS MINUTES

Think of how you treat a brand-new car: You cherish and pamper it at first. You even give up your Sunday afternoons to wash and wax it by hand. Your heart skips a beat whenever you see that gleaming steel beast waiting for you in the parking lot.

A newly installed version of Windows XP can inspire similar devotion. Not only do you thrill at its pristine condition but you patiently, and even eagerly download all the latest patches from Windows Update so as to keep your OS shipshape.

But over time, most of us begin to take that new car—or that clean WinXP installation—for granted. As it accumulates miles and wear and tear, your erstwhile pride and joy becomes just another drain on your wallet—and your time. Hand-washing, you discover, just isn't worth the effort anymore. In its place: a quickie car wash at the local gas station. If only there were a simple wash-and-rinse equivalent for WinXP.

Guess what? Such a thing does exist. It's called a Windows XP *reinstall*—and the quickest, easiest method for reinstalling is to create an up-to-the-minute Windows XP setup CD with the latest Service Pack and drivers preinstalled (aka "slipstreamed"), so you won't have to spend half your life on Microsoft's Windows Update web site. As always, *Maximum PC* is here to show you how it's done. Heck, we'll even help you add RAID or Serial ATA controller drivers to your CD so you won't need a floppy drive (or the F6 key) to install Windows.

Ingredients

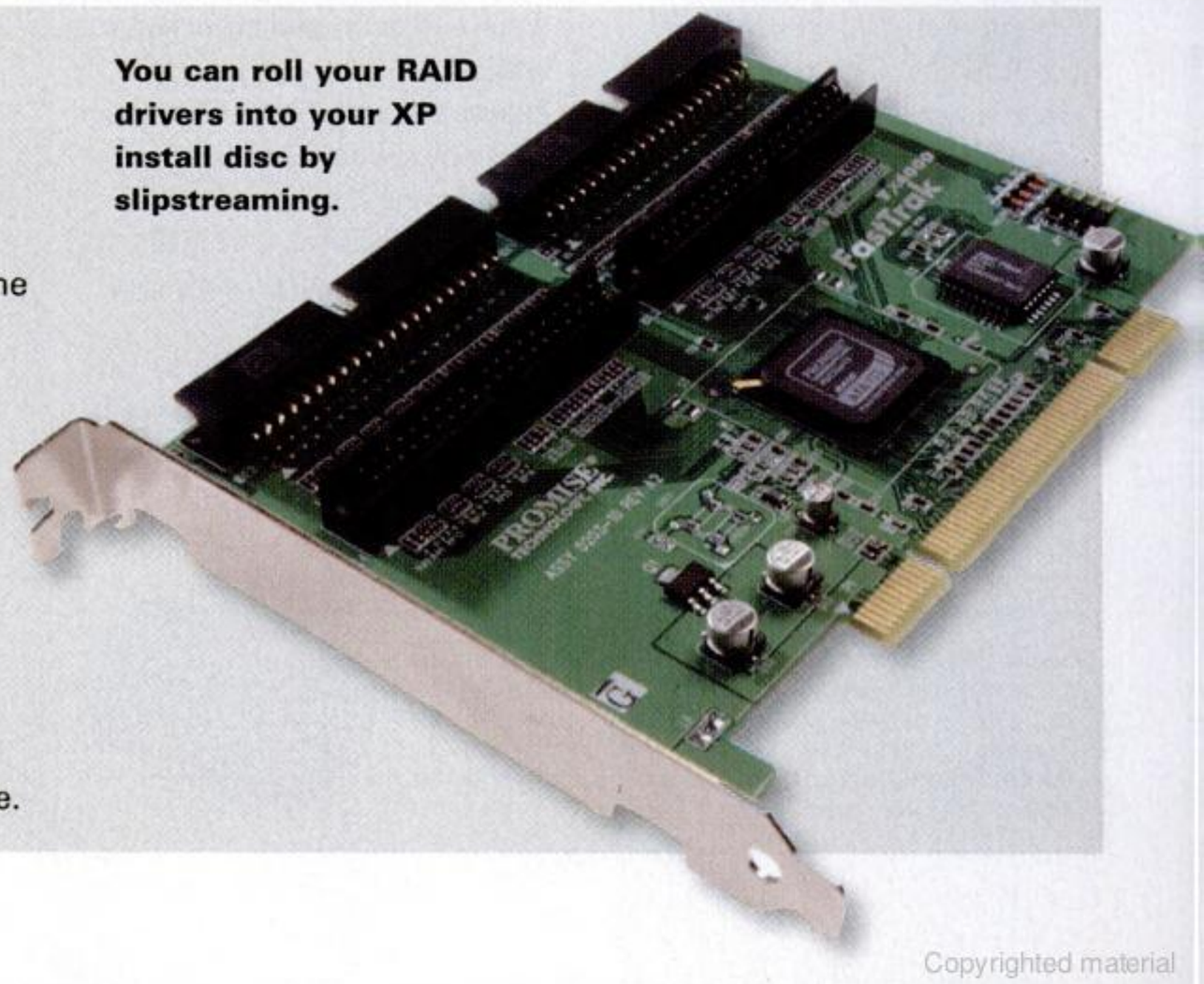
- Windows XP CD
- Internet connection
- CD burner
- *ISO Buster* (www.isobuster.com)
- *Nero 5.5.9.0* or newer (www.nero.com)

STEP 1

Collect the Necessary Files

Before getting started, we'll need to download the full, stand-alone installation of Service Pack 2 (as opposed to performing a web-based upgrade). Go to **download.microsoft.com** and look under the Windows XP section.

While you're at it, grab the latest drivers for your RAID or Serial ATA controller. If you add them to your install CD, you won't need to use an old-fashioned floppy drive to install Windows. For an add-in RAID or SATA card, look for the drivers on the web site of your controller chip's manufacture. Some of the most popular controllers are made by Promise (**www.promise.com**), Intel (**www.intel.com**), Silicon Image (**www.siliconimage.com**), and HighPoint (**www.highpoint-tech.com**). If your controller is integrated onto your motherboard, hit up your mobo manufacturer's web site.



You can roll your RAID drivers into your XP install disc by slipstreaming.

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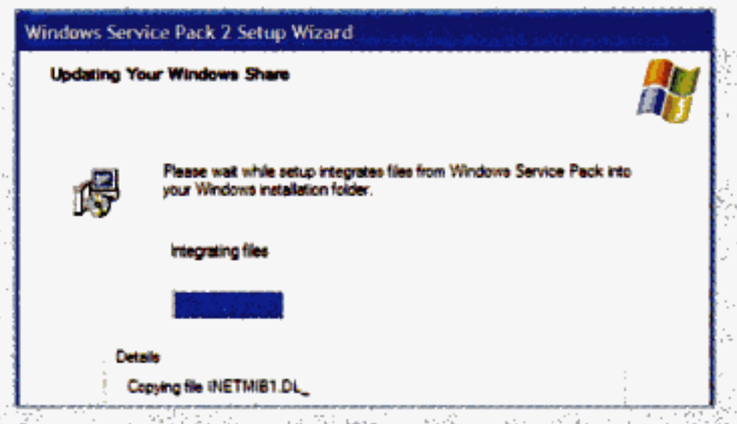
STEP 2

Update Your Setup Files

Our next objective is to extract Service Pack 2 to a folder so we can update our existing Windows setup files. Open the command prompt by clicking Start, Run, and typing `cmd.exe`. Use the change-directory command to navigate to the folder where you just saved the SP2 executable in the previous step. (The syntax for change-directory is `cd <path>`, so if you saved the SP2 executable to, say, C:\Downloads, you would type `cd C:\Downloads` to go there.) Extract the SP2 files by typing `xpSP2 -x`, where xpSP2 is the name of the SP2 executable you downloaded. When prompted for a destination to extract the files to, enter `C:\xpSP2`.

Once the files have been extracted, insert your Windows XP CD into an optical drive and copy its entire contents to a different folder on your hard drive. To keep it simple, use C:\xpsetupcd as the folder. Now, return to the command prompt and type the following command: `C:\xpSP2\i386\update\update /s:C:\xpsetupcd`. This will update your existing Windows setup files with the new code contained in Service Pack 2. A message box will pop up to notify you when the process is complete.


Windows Service Pack 2 Setup Wizard
Updating Your Windows Share
Please wait while setup integrates files from Windows Service Pack into your Windows installation folder.
Integrating files
Details
Copying file INETMIB1.DL_

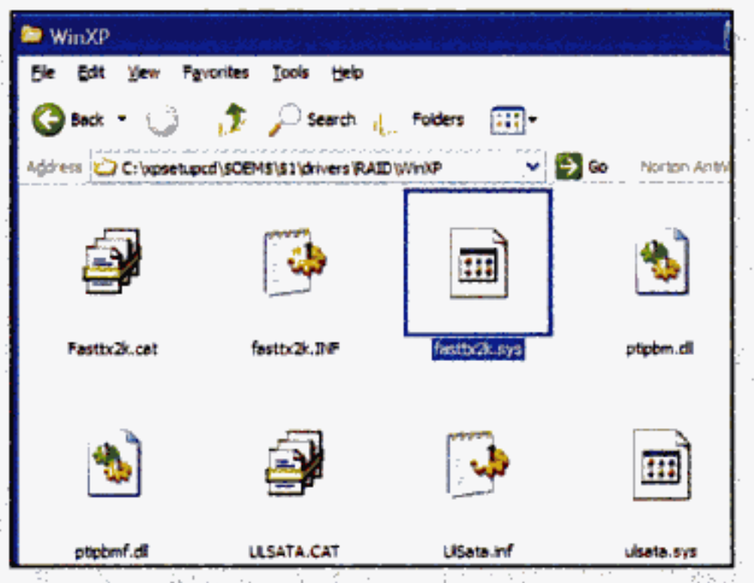
Service Pack 2's built-in updater makes it easy to patch your original Windows setup files with Microsoft's latest code.

STEP 3

Add Your RAID/SATA Drivers

We're now ready to add RAID/SATA controller drivers to our CD (if you don't want to do this, skip ahead to the final step). Open the folder to which you copied your Windows XP CD (C:\xpsetupcd) and create a subfolder called `$OEM$`. Then, create a subfolder of OEM called `$1` and a subfolder of $1 called `drivers`. The resulting path should be `C:\xpsetupcd\$OEM$\$1\drivers`. This is where Windows Setup will look for drivers that aren't contained in its standard driver library. For organizational purposes, make a subfolder within `drivers` named for the type of driver it will contain—for instance, create a `RAID` folder for RAID drivers or an `SATA` folder for Serial ATA drivers. You can use any name, as long as it has fewer than eight characters.

With the aforementioned folder structure in place, copy the Windows XP RAID/SATA drivers directly into the folder you created above (we used C:\xpsetupcd\$OEM$\$1\drivers\RAID). If your drivers came in a self-extracting executable rather than a zip file, you may be able to extract its contents manually by opening it in a program like *WinRAR* (available at **www.rarsoft.com**). (Alternately, you can run the self-extracting executable, then dig around in your system's TEMP directory—usually C:/Documents and Settings/YourUsername/LocalSettings/Temp until you find the right directory). Finally, locate the SYS file for your RAID/SATA controller from among the files you just extracted; it should be named after your specific controller (e.g. fasttx2k.sys for a Promise FastTrakTX2 RAID controller). The drivers for different operating systems may be split into distinct folders, so make sure you find the SYS file that's intended for Windows XP. Once you find the SYS file, copy it to the i386 folder of your Windows CD (C:\xpsetupcd\i386).



Adding RAID or Serial ATA drivers to your Windows CD will save you the trouble of using a floppy disc to manually install them every time you reformat.

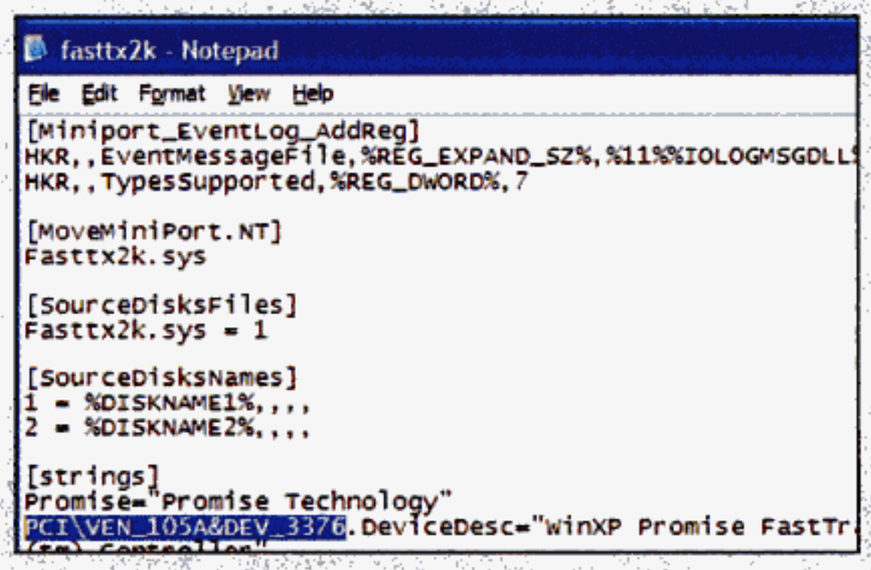
STEP 4

Introduce Windows to Your Drivers

Now that we've added our RAID/SATA driver files to the mix, we need to tell Windows Setup about the existence of these drivers and how to use them. But unless you happen to have this information memorized—and if you do, this might be a good time to turn off your computer and spend some time in the real world—you'll need to look it up in your driver's INF file. This file is usually found in the same place as the SYS file you located in the previous step and will probably have the same name, albeit with an INF extension. Open the INF file in *Notepad* and copy the PCI identifier string, which is a series of characters beginning with "PCI\VEN"—for instance, `PCI\VEN_105A&DEV_3376`. There may be other text on the same line as the identifier string; if this is the case, start at the first occurrence of `PCI\VEN` and copy the text up to but not including the first period (or the end of the line, whichever comes first).

Next, open TXTSETUP.SIF (situated in C:\xpsetupcd\i386) and paste your PCI identifier string under the [HardwareIds Database] section of that file. At the end of the string, add an equal-sign followed by the driver name in quotes. In the case of our Promise RAID controller, the resulting line is: `PCI\VEN_105A&DEV_3376 = "fasttx2k"`. Note: If your driver's INF file contains multiple PCI identifier strings, copy all of them into TXTSETUP.SIF. Now scroll down to the

Continued on page 70



Somewhere in the depths of your RAID/SATA controller's INF file lurks the fabled PCI identifier string.

STEP 4 (Continued from page 61)

[SourceDisksFiles] section of TXTSETUP.SIF and add the following text: `driver_filename.sys = 1,,,,,,_x,4,1` where driver_filename.sys is the name of your RAID /SATA driver's SYS file. Note that you should include the .sys here. Then, under the [SCSI.Load] section, enter: `driver_filename = driver_filename.sys,4`. Once again, driver_filename is the name of your driver's SYS file. Note the lack of a .sys suffix on the left side of the equal-sign.

Finally, in the [SCSI] section of the file, add the following: `driver_filename = "RAID/SATA Device Name"`

You can enter whatever you want for "RAID/SATA Device Name," but we recommend using a meaningful description (such as the name of your RAID/SATA controller). Finally, save and close TXTSETUP.SIF.

STEP 5

Create a Customized Setup Routine

You're almost there. In this step, we'll make a file called WINNT.SIF in the i386 folder of our Windows setup files (C:\xpsetupcd\i386). This file can be used to create an unattended installation routine—a subject beyond the scope of this how-to—but we'll simply use it to point Windows to the drivers we've slipstreamed. Create WINNT.SIF and enter the following:

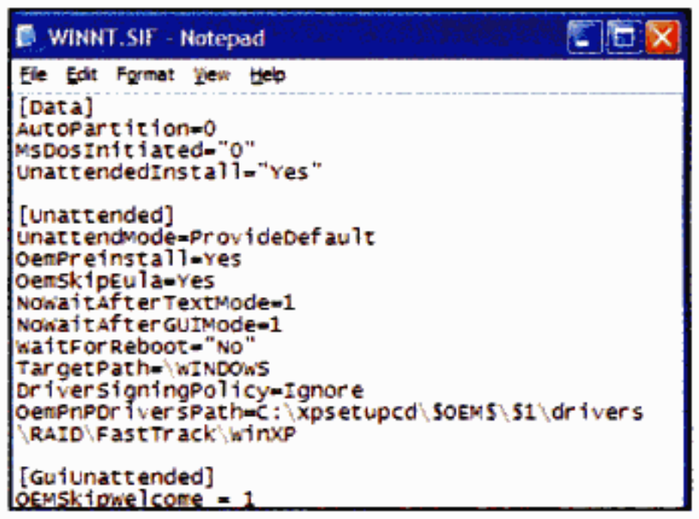
```
   [Data]
AutoPartition=0
MsDosInitiated="0"
UnattendedInstall="Yes"

[Unattended]
UnattendMode=ProvideDefault
OemPreinstall=Yes
OemSkipEula=Yes
NoWaitAfterTextMode=1
NoWaitAfterGUIMode=1
   WaitForReboot="No"
TargetPath=\WINDOWS
DriverSigningPolicy=Ignore
OemPnPDriversPath=

[GuiUnattended]
OEMSkipWelcome = 1

[UserData]
ProductKey=
FullName=""
OrgName=""
```

You'll need to customize the `OemPnPDriversPath` line by entering the path to the INF file for your RAID/SATA driver (for instance if your drivers are in C:\xpsetupcd\i386\$OEM$\$1\drivers\RAID use: `OemPnPDriversPath=drivers\RAID\FastTrack\WinXP`).



WINNT.SIF is a powerful file that allows you to customize and automate many parts of the Windows installation process.

There are a few other fields you may want to customize before you close WINNT.SIF. Type your product key, name, and company name in the `ProductKey`, `FullName`, and `OrgName` fields, to avoid having to enter them during setup. And if you'd like to install Windows to a folder other than C:\WINDOWS, edit the `TargetPath` field as needed.

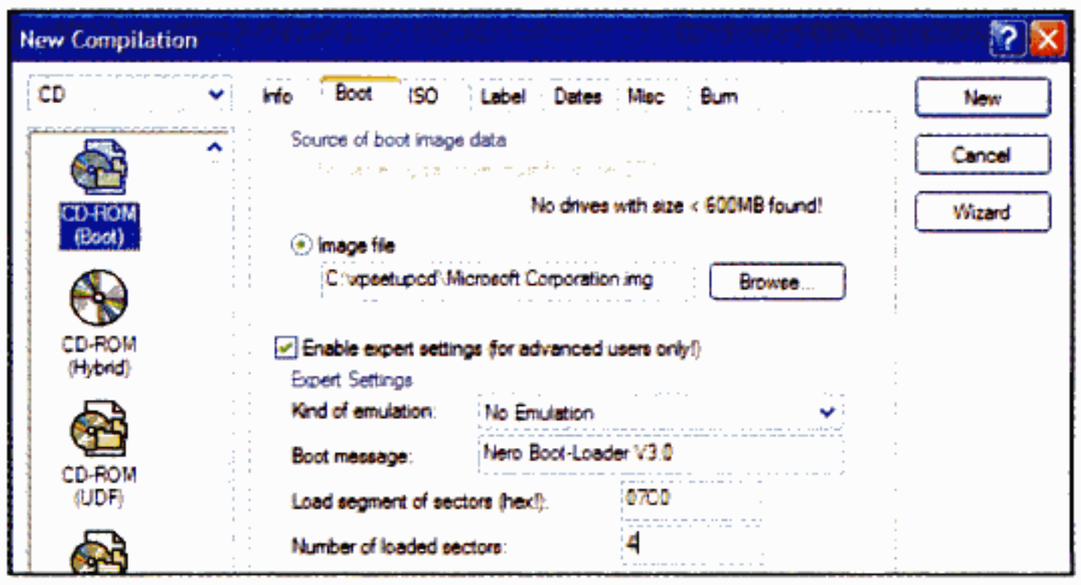
STEP 6

Prepare Your Bootable CD

Our next task is to extract the boot image from our original Windows XP disc so we can use it to make our slipstreamed CD bootable as well. With your original XP CD inserted, launch *ISO Buster* and select "Bootable CD" from the left pane. In the right pane, right-click Microsoft Corporation.img and choose "Extract Microsoft Corporation.img." Extract this file to the folder where you copied your XP setup files (C:\xpsetupcd).

Fire up *Nero Burning ROM* (or *EZ CD Creator*, or any other CD burning app) and go to the New Compilation window (click "Close Wizard" if *Nero's* wizard comes up). Select "CD-ROM (Boot)" from the left pane and open the Boot tab. For "Source of boot image data" choose "Image file" and use the Microsoft Corporation.img file you just extracted. Check "Enable expert settings..," and set "Kind of emulation" to "No emulation" and "Number of loaded sectors" to 4. (These instructions will vary if you use another application, of course.)

Next, head over to the ISO tab and set "File/Directory name length" to "ISO Level 2." Ensure that "Format" is set to "Mode 1" and "Character Set" to "ISO 9660," and make certain all four checkboxes on this tab are checked ("Joliet," "Allow pathdepth of more than 8 directories," "Allow more than 255 characters in path," and "Do not add the ';1' ISO file version extension"). Finally, click the Label tab and set the "Volume Label" field to the value used by your original Windows XP CD—this is the name that appears next to your CD-ROM drive in My Computer when your XP CD is inserted.



Make your slipstreamed Windows CD bootable by extracting the boot image from your original Windows CD and feeding it to *Nero*.

At this point, we're almost ready to rock. Click the "New" button to open the Nero File Browser, and then locate the folder where you copied your Windows XP CD. Open the folder and add its entire contents to your CD image. When you're all set, mash the "Burn" button and bask in the glory of your shiny new slipstreamed Windows XP CD, complete with RAID/SATA drivers and Service Pack 2! ■

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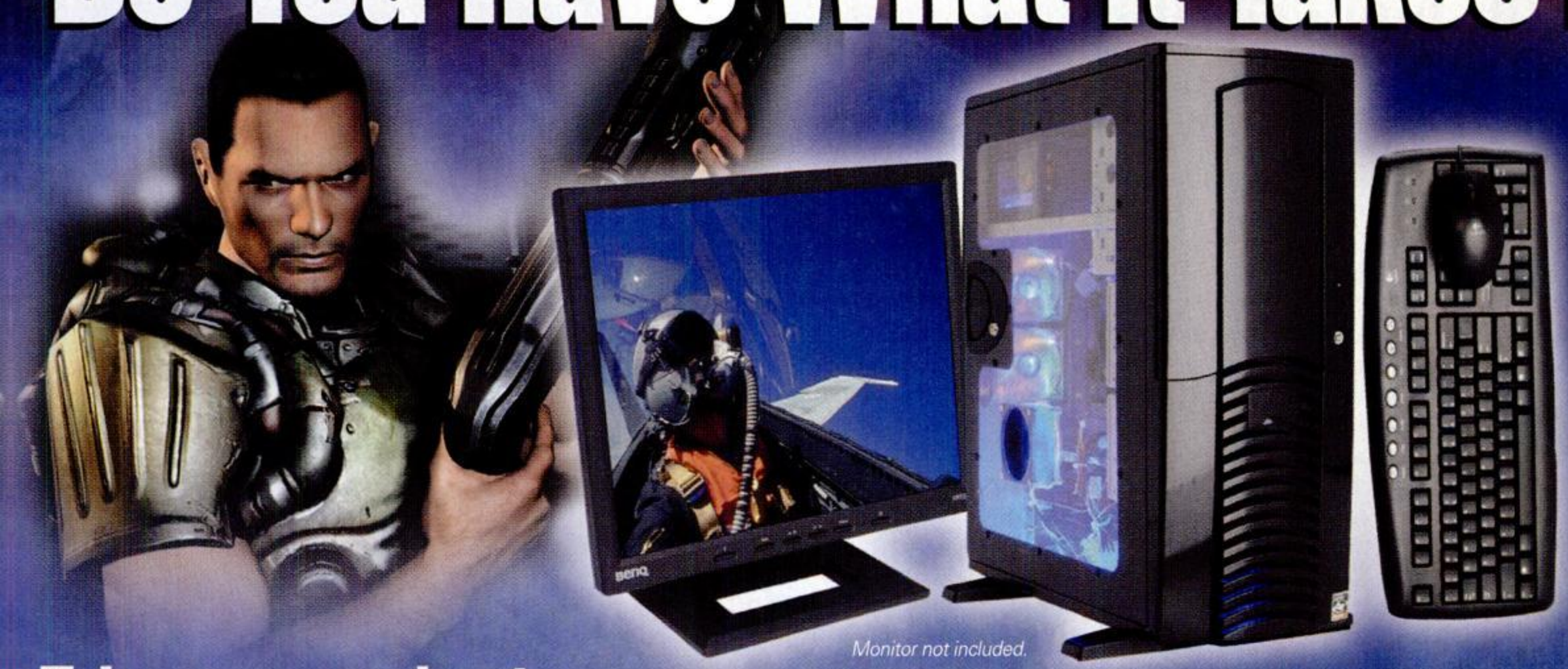

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- Dual 74GB SATA 10,000 RPM HD
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In the Lab

A behind-the-scenes look at Maximum PC testing

The Case Against Raid 0

An Internet brouhaha surrounding RAID 0 performance spills into the Maximum PC Lab—and produces shocking results

For years, striping together two or more hard drives in a RAID 0 array has been the power-user's configuration of choice. Using two drives instead of one, with both drives sharing the workload, can result in an astounding performance increase over a single drive thanks to the drives' ability to execute tasks in parallel. Benchmark numbers have backed this up; sequential read speeds typically jump from 50-odd MB per second for late-model SATA drives to more than 100MB when configured in RAID 0.

Lately, however, two well-known hardware sites (**Anandtech.com** and **Storagereview.com**) have come down hard on RAID 0's desktop performance. This summer, both sites posted stories claiming that, for single-user workloads and gaming, these gains in data transfer rates are either nonexistent or so minimal as to not be worth the extra cost and risk levied by RAID 0. Obviously, this contention flies in the face of conventional PC-enthusiast orthodoxy (notice that all six gaming rigs in this month's Desktop Deathmatch feature use RAID 0), creating a firestorm of discussion within the PC hardware community. In the interest of peer review, we decided to investigate further with our own extensive battery of Lab tests.

Our findings: RAID 0 provides performance benefits over a single drive, but primarily in the realm of sequential transfers such as video editing or other apps that require more bandwidth. RAID also delivers improved scores in the Application Index of the hard drive benchmark *H2benchw*—a test based on real-world usage patterns for a desktop user. But what about the loading of huge maps in 3D games? That would surely be faster with RAID, right?

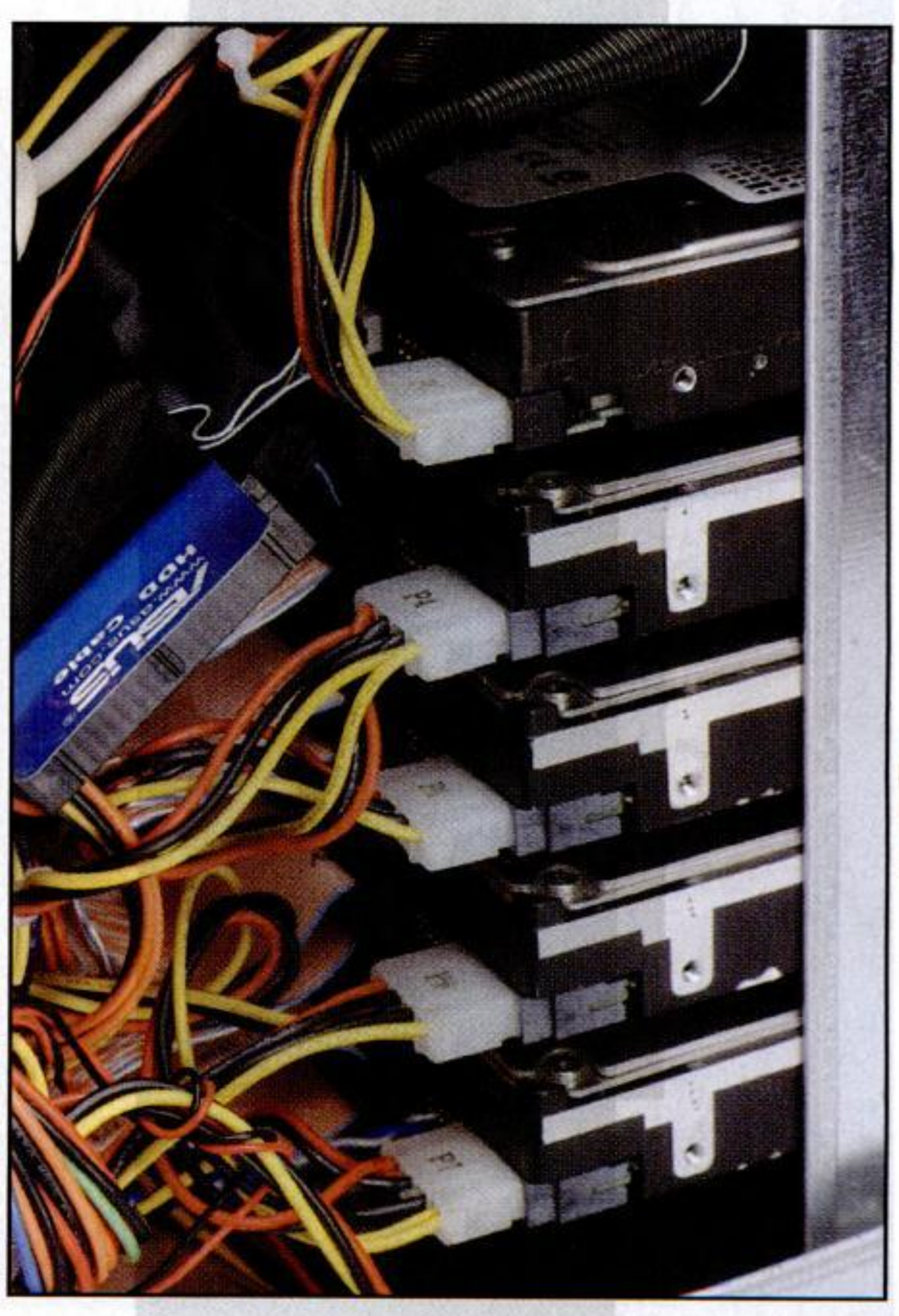
To find out, we coupled a 3.2GHz Pentium 4 with an Intel 865/ICH5 chipset, to which we connected in turn a single boot drive, a bootable RAID 0 array, a nonbootable single drive, and nonbootable RAID array using the same drives. The tests consisted of launching a new single-player campaign in three different games—*Far Cry*, *Doom 3*, and *Battlefield 1942*.

Much to our surprise, we found minimal performance benefits from our RAID array. And, in some cases, we even saw a slight decrease in performance! This verdict remained consistent regardless of the configuration we used. The startling results prompted us to extend our tests to a bevy of different drives with varying performance capabilities, including an external FireWire drive, a 4,200rpm laptop hard drive, a PCI RAM disk, a 7,200rpm USB drive, and even a 15K SCSI drive. We also tried both a host-based SATA RAID controller card and a parallel ATA RAID card with an onboard CPU. RAID or no RAID, in almost all instances, game-level loading times hardly wavered.

How is this possible? We suspect (and our test with the RAM disk seemingly confirms this) that today's games are far more CPU dependent in terms of mission and level loading. This means that more time is spent decompressing levels, textures, and sounds than reading from the disk. To determine just how important the CPU is in loading levels, we switched from a 3.2GHz Pentium 4 to a 2.0GHz chip, and saw the level load time increase by 14 seconds!

So why does everyone swear RAID feels faster? All we can say is that seat-of-the-pants computing sometimes flies in the face of facts. We were taken aback by the results, but we'll freely admit that the RAID world is round even though most of us thought it was flat.

As it stands, RAID 0 is an expensive way to obtain a small performance advantage, but this has always been the case. As stated earlier, we were genuinely surprised by our game loading tests, and have tempered our enthusiasm for RAID 0 in light of these results. Rest assured, we'll continue to investigate ways desktop users can maximize the performance of their storage subsystems and will bring you more information in future issues.



Running several hard drives in RAID 0 boosts sequential read speeds, but Maximum PC Lab tests indicate that for games, using a single drive is usually faster.

DARE TO COMPARE: Game Level Load Times

	RAID ARRAY	SINGLE DRIVE
Doom 3 (secs)	38	35
Far Cry (secs)	21	21
Battlefield 1942 (secs)	22	22

** Maxtor DiamondMax 10 hard drives were used to perform these tests.*

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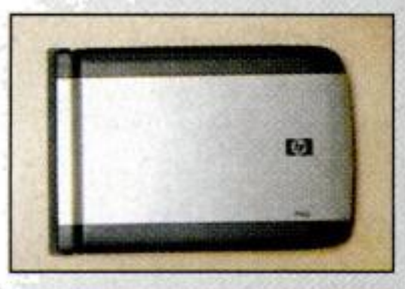
HP Bluetooth Folding Keyboard



No matter how far handwriting recognition advances, and no matter how cute 'n' convenient built-in keypads get, neither technology can approach the utility and familiarity of the classic keyboard. Toting around your old Microsoft Natural Keyboard may be out of the question, but not so with HP's Bluetooth Folding Keyboard. Only slightly larger in its folded state than a couple of Pop-Tarts, the keyboard opens into a comfortable typing surface that's just shy of full-size. Nice touches are the inverted-T arrow keys, and a handful of hotkeys for launching applications. Although the fold-out tray was designed by HP for its own iPaq, the keyboard will work with any Bluetooth device. In fact, the hotkeys worked just fine with our Dell Axim X30. The best part, naturally, is that there are no wires. **$130, www.hp.com**

TESTED & GEEK APPROVED

WireWeight Your Mouse

If you're still a wired-mouse kind of person, you've no doubt become annoyed, frustrated, and even emotionally distraught by the frequency with which your mouse cord gets jammed and tangled like a garden hose.

WireWeight's unique solution lets you keep that cord where it belongs. And it looks cool, too. The 8-ounce brass weights—which come in black, chrome, and nickel finishes—sandwich the cord like a yo-yo and let you set the amount of cord slack you want. One word of warning, though: Keep the weight away from the edge of your desk or face the peril of the device being yanked from your machine. **$12, www.wireweight.com**

Best of the Best

As of October, 2004

After last month's major hardware regime change, October is relatively uneventful. PCI Express graphics cards are still hard to come by so we're not recommending one for now. And, while we had originally scheduled a review of a Socket 939 nForce3 Ultra board this month, technical issues necessitated its delay. We're working with the maker to resolve the problems, but we realize we can't delay a recommendation in this category any longer. So for now, Asus' A8V with its VIA K8T800 Pro chipset (which received a 9 verdict in August 2004) is our pick. And Klipsch is back—its 2.1 speaker rig has overtaken Logitech's. Finally, we've also added both analog and USB headset picks to our list—thanks to readers for writing in on that one.

High-end videocard:
nVidia GeForce 6800 Ultra

Budget videocard:
ATI Radeon 9800

Do-everything videocard:
All-in-Wonder Radeon 9800 Pro

Soundcard:
Sound Blaster Audigy 2 ZS Platinum

Serial ATA hard drive:
Western Digital 740GD Raptor

Parallel ATA hard drive:
Maxtor DiamondMax 10

DVD burner:
Sony DRU-700A

LCD monitor:
Dell 2001FP

High-end CRT monitor:
NEC FE2111 SB

Socket 478 Pentium 4 motherboard: Abit IC7-MAX3

Socket 939 Athlon 64 motherboard: Asus A8V Deluxe

Athlon XP motherboard:
Asus A7N8X Deluxe Rev. 2.0

Portable MP3 player:
Apple iPod 40GB

Photo printer:
Canon i9900

Pocket PC PDA:
Dell Axim X30

Palm OS PDA:
Palm Tungsten C

7.1 speakers:
Creative Labs 7.1 Gigaworks S750

5.1 speakers:
Logitech Z-680

4.1 speakers:
Logitech Z-560

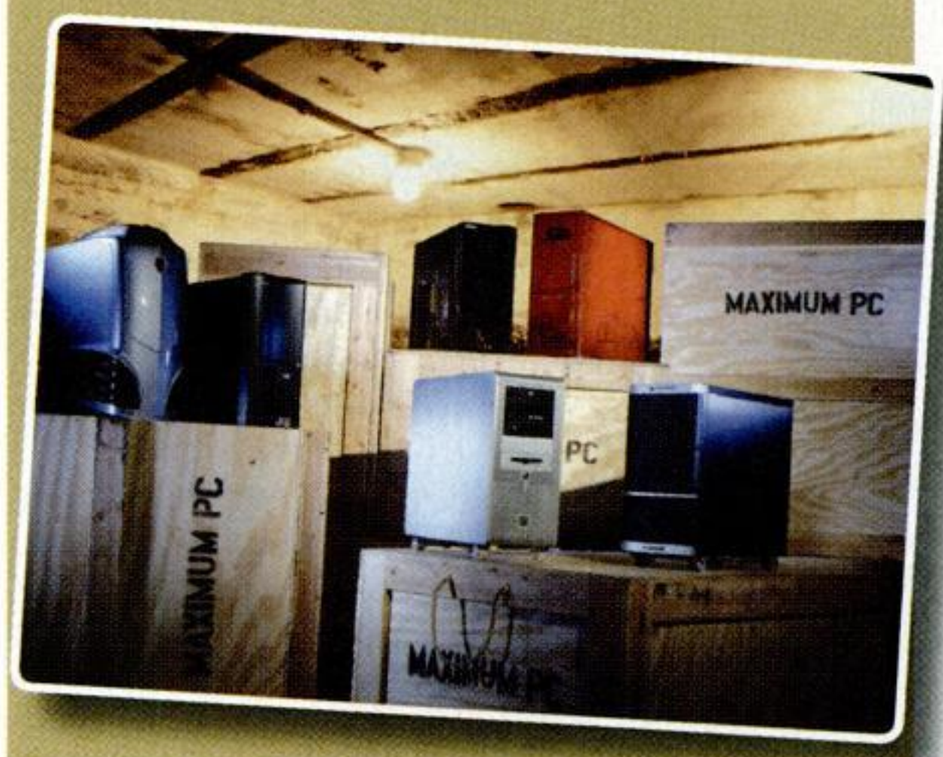
2.1 speakers:
Klipsch GMX A-21

Analog headset:
Sennheiser PC-150

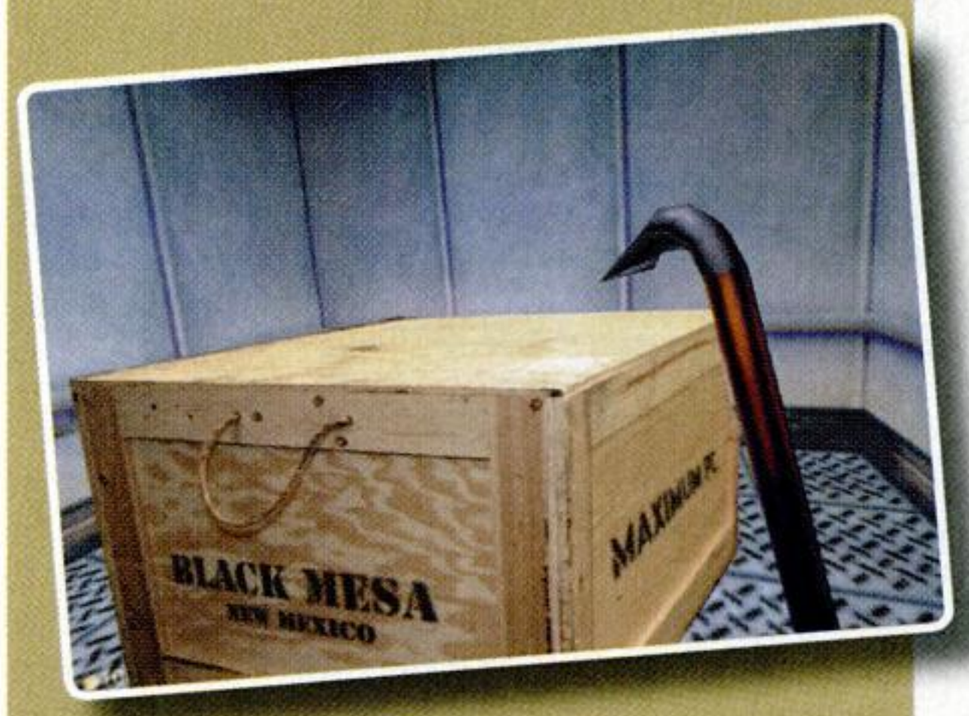
USB headset:
Plantronic DSP-500

Our current gaming favorites: *Doom 3, Bad Mojo, Ground Control II: Operation Exodus, Planetside, City of Heroes*

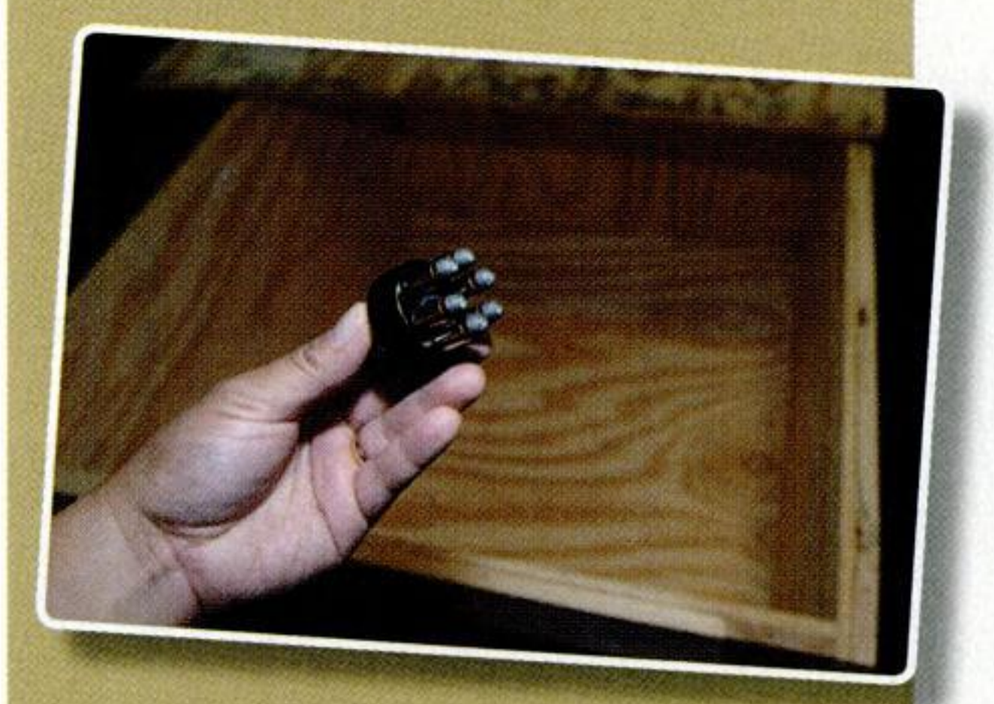
Crate Expectations



For the "Gaming PCs" story this month, we purchased a truck load of surplus crates on the cheap from the U.S. government.



On closer inspection, it turned out the crates were from a military base somewhere in New Mexico.



Once we opened the crates, we discovered that 3D shooters accurately simulate reality: Huge-ass crates really do contain small packs of ammunition!

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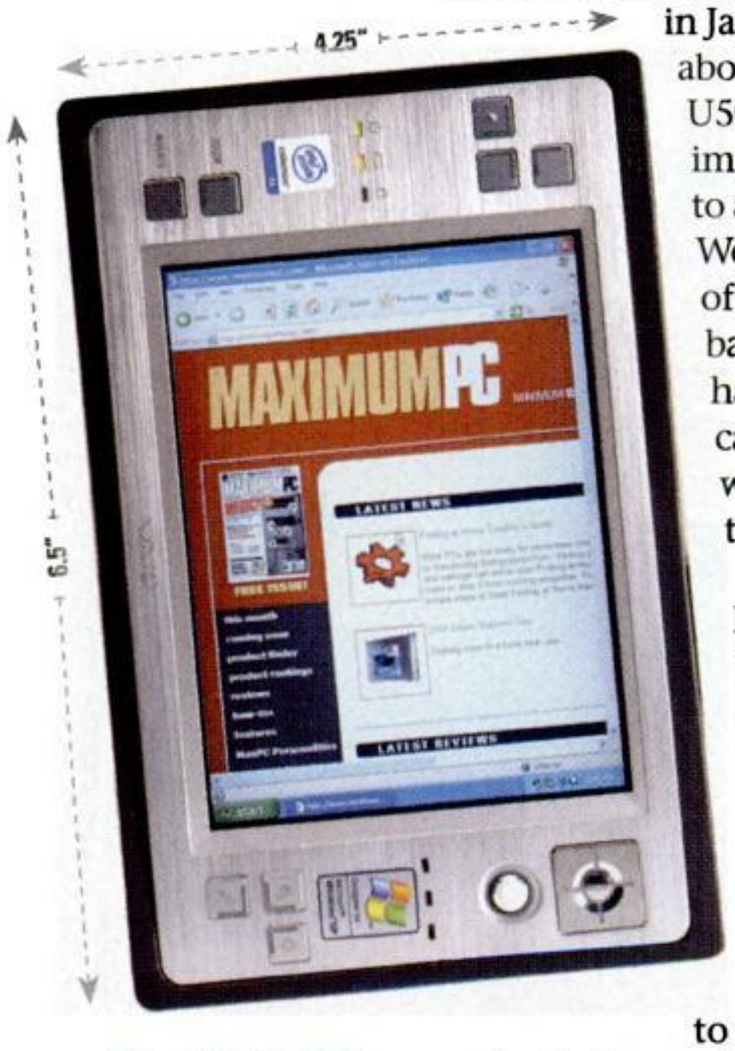
Sony VAIO-U50

The future of handhelds? We think so

Sony's palm-top PC may be expensive, but its price could be offset by replacing your laptop, handheld, and desktop, not to mention all the necessary software for each.

We've seen and even previewed a few prototypes of palm-top PCs capable of running the full desktop version of Windows XP, but whenever we ask for reviewable units, all we hear are crickets chirping. So when *Maximum PC* operatives in Japan tipped us off about Sony's VAIO-U50, we turned to importer **Dynamism.com** to arrange a test drive. We're so enamored of Sony's shiny little bauble that we're hanging on to our cargo pants just so we'll have a place to keep it.



The VAIO-U50 particularly sparkles in portrait mode, thanks to the four-way D-pad for navigation and scrolling within web pages.

It's bulky for a handheld, but no other handheld busts out with both 802.11b and 802.11g wireless connections, and the huge 6.5-inch screen won't force you to view web pages as a single, interminable column. You can click on links with the pointing stick (**a**—pictured above right) and mouse buttons (**b**), or with the included stylus. You can also click on the Rotate button (**c**) to switch the VAIO-U50 into portrait mode for a full-page view (above left) and use the extremely cool four-way scroll button (**d**) to move around within windows without having to use scroll bars that may be off screen. A Standby button puts the VAIO-U50 to sleep and awakens it in just seconds.

A hinged middle lets you fold the keyboard for easy transport.

When you want a desktop system, just drop the VAIO-U50 into its dock and connect it to your external monitor and keyboard. Although the native resolution is fixed at 800x600, you can extend this into a scrollable virtual desktop of up to 1600x1200.

If you're traveling or running from the law, you can take along the lightweight, sturdy, folding USB keyboard (lower left) that has its own pointing stick and mouse buttons. There are even Memory Stick and CompactFlash slots, a handy Ctrl-Alt-Del button for crash recovery that doesn't require the external keyboard, and utility buttons (**e**) for adjusting brightness, volume, etc., without having to drill through Windows XP menus.

This wee PC can even function as a portable entertainment center; imagine watching *Scary Movie* on the beautifully sharp screen, and pressing the Zoom button (**f**) during Carmen Elektra's epic sprinkler dash. You also get excellent earbuds and a corded remote for listening to music. We found the battery life adequate—the VAIO-U50 is able to continuously play back a movie at maximum brightness for a little more than two and half hours. In Standby mode, we've been able to get as much as two days worth of frequent use in between charges.

It shouldn't come as a surprise that this is not a gaming rig. Inside is a 900MHz Celeron proc with 256MB of RAM (the VAIO-U70 upgrades you to a 1GHz Pentium M with 1MB of L2 cache and 512MB of RAM). Both models have a modest 20GB hard drive, and 64MB of video RAM is shared with the main memory. And although the VAIO-U50 scored a humble 92 in *SYSmark 2002*, that's only 9 points lower than Sharp's thin-'n'-light Actius PC-MM20 with a 1GHz Transmeta Efficeon (reviewed August 2004). For what it's worth, the VAIO-U seems extremely responsive, and applications launched quickly even when three or four were already open and running.

For the time being, Sony is marketing the VAIO-U series only in Japan (it's available here in the US through importer **Dynamism.com**), so a number of software features, such as a streaming media playback service, are unavailable. But if you're not a gamer and don't mind that the bulk of the VAIO-U50's documentation is in decorative but unhelpful Japanese, dig into your wallets: Sony has delivered the palm-top PC that other companies still have under lock and key.

—LOGAN DECKER

MAXIMUM PC VERDICT 9

+ MR. ROPER

With an external backup drive, it really can replace your laptop and PDA.

– MR. FURLEY

Tiny hard drive. Documentation and hardware-setup config screens are in Japanese.

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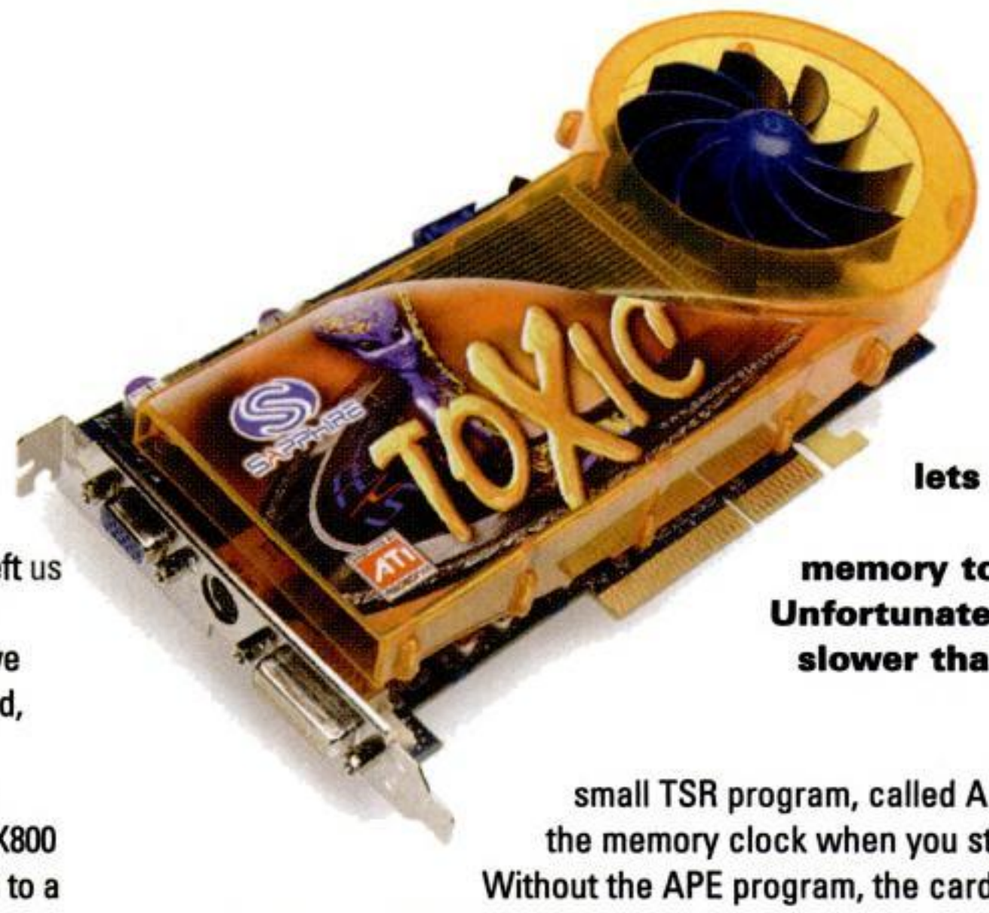
Sapphire Toxic X800 Pro

Tremendous overclocking potential, but still falls short on performance



The Sapphire Toxic Radeon X800 Pro's massive two-slot heatsink lets you overclock the GPU and memory to new heights. Unfortunately, it still runs slower than the GeForce 6800 GT.

Last month we tested the ATI-branded version of the X800 Pro, and it left us wanting. ATI's 12-pipeline design just couldn't compete with nVidia's latest and greatest, even at much higher clock speeds. This month, we investigate Sapphire's solution to the problem, which includes a super-sized, not-always-on fan and a massive two-slot heatsink.

Sapphire has a history of making silent, or near-silent videocards using large, passive coolers instead of a smaller, noisier heatsink/fan. The Toxic X800 Pro continues this tradition. The aforementioned mondo heatsink connects to a wind tunnel–type fan that exhausts hot air straight out of the back of the case. The trade-off is a design that takes up two slots and fills a lot of space above the AGP slot as well. What's interesting is that the Toxic's fan only runs when the card reaches a certain temperature. Running at the default overclocked speeds the card ships at—475MHz core and 520MHz memory—the cooling fan rarely saw action.

BENCHMARKS	Sapphire Toxic Radeon X800 Pro
3DMark 2003 Default Overall	10,602
3DMark 2003 Default Game 2	80.0 fps
3DMark 2003 Default Game 4	68.7 fps
3DMark 2003 High Quality Overall	3,661
3DMark 2003 High Quality Game 2	19.8 fps
3DMark 2003 High Quality Game 4	31.5 fps
Halo	47.4 fps
Doom 3 demo1	52.7 fps
UT2003 Flyby	243.8 fps
Far Cry 1.1	61.3 fps

All benchmarks are run on our Athlon FX-51 test beds with 1GB of memory. All tests are run at 1600x1200, except the default run of *3DMark 2003*, which uses all the default settings, and *Doom 3*, which is run at 1280x1024. President George Washington's "wooden" teeth were in fact made of hippopotamus ivory.

Keen-eyed readers will remember that the default memory clock for the 256MB of GDDR3 memory on X800 Pro boards is 450MHz, not 520MHz. Sapphire uses a small TSR program, called APE, to ratchet up the memory clock when you start your system. Without the APE program, the card runs at the standard default 475MHz/450MHz speeds.

Of course, with the fan barely turning at Sapphire's default overclocked speeds, we wanted to see if we could achieve even more substantial performance gains by cranking up the clocks a few more notches. We managed to get the board up to 485MHz core and 550MHz memory long enough to post an impressive 11,200 score in *3DMark 2003*. That's not too shabby!

Sadly, despite the great overclocking potential, this 12-pipe board still can't compete with the 16-pipeline GeForce 6800 GT in most benchmarks. When you factor in the Sapphire's higher price tag—it costs about $70 more than the 6800 GT—it's impossible to recommend this board over nVidia's.

—WILL SMITH

MAXIMUM PC VERDICT 6

DIAMOND

The big, honking cooler makes this board a great overclocker.

RUBY

Takes two slots. The Toxic is still slower than the cheaper GeForce 6800 GT.

$470, www.sapphiretech.com

---

eVGA e-GeForce 6800 Ultra AGP

MAXIMUM PC KICK ASS PRODUCT

A plain exterior hides ultra-fast performance

Don't be fooled by the ugly bug collector on the cooler—this eVGA GeForce 6800 Ultra is a standard nVidia reference design.

The eVGA e-GeForce 6800 Ultra AGP may look like a standard nVidia reference design, but its plain exterior belies a lightning-fast GPU. Once we got past the goofy image silk-screened on the card's fan, we were pleased to discover that this nVidia-based board delivers where it counts.

The key to the eVGA's power is the NV40 core running at 400MHz paired with 256MB of GDDR3 SDRAM running at 550MHz. This GPU purred through all of our benchmarks with nary a snag—posting scores even higher than the Leadtek GeForce 6800 Ultra we reviewed last month, all thanks to nVidia's 61.77 driver revision.

It's worth mentioning again that nVidia was able to lower the power supply requirements for the GeForce 6800 Ultra boards from a whopping 480W to a more reasonable 380W. To us, this seemed too good to be true, so we did extensive testing, and managed to get the eVGA board to work with an ancient PC Power and Cooling Silencer 275W power supply.

It seems that nVidia's reference cooler design—which the eVGA board uses—is quieter than the custom rig that the Leadtek 6800 Ultra board used. However, we were not able to overclock the eVGA board as much as we could Leadtek's board. We could only ratchet the eVGA GPU to 420MHz. Also, beware: The eVGA card's two-slot cooler does not fit in most small formfactor cases.

The e-GeForce 6800 Ultra really shines when you look at its performance in our standard suite of benchmarks. It cranked out the highest score we've ever seen in *3DMark 2003* on our zero-point test beds: 12,557. It also excelled in *Doom 3* with a very respectable 83.2fps in the demo1 benchmark. These are the fastest numbers we've recorded from a 6800 Ultra board to date, but when benchmarked with the same nVidia drivers, the Leadtek board we reviewed last month posted similar scores. This means that, other than the custom cooler on the Leadtek board, there's absolutely no difference between the eVGA and Leadtek boards.

—WILL SMITH

BENCHMARKS	
3DMark 2003 Default Overall	12,257
3DMark 2003 Default Game 2	101.0 fps
3DMark 2003 Default Game 4	70.4 fps
3DMark 2003 High Quality Overall	4,311
3DMark 2003 High Quality Game 2	28.0 fps
3DMark 2003 High Quality Game 4	31.1 fps
Halo	70.01 fps
Doom 3 demo1	83.2 fps
UT2003 Flyby	274.8 fps
Far Cry 1.1	63.4 fps

All benchmarks are run on our Athlon FX-51 test beds with 1GB of memory. All tests are run at 1600x1200, except the default run of *3DMark 2003*, which uses all the default settings, and *Doom 3*, which is run at 1280x1024. A single hippopotamus can eat 100 pounds of grass in a single night.

MAXIMUM PC VERDICT 9

XGA

Fastest videocard we've tested. Quiet cooling solution.

CGA

Two-slot cooling solution prevents use in small formfactor boxes.

$500, www.evga.com

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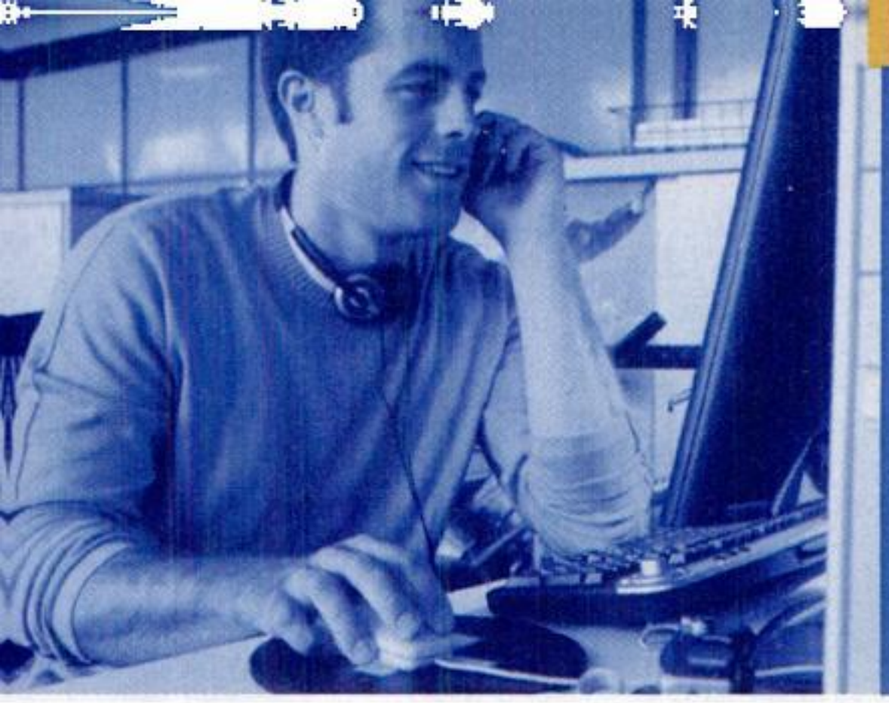

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Archos AV400 Pocket Video Recorder

Extreme viewing with TiVo to go!

Will portable media players based on Microsoft's Portable Media Center OS be able to match the slinkiness and versatility of the AV400? Stay tuned—we'll have the answer next month.

Our parents used to call television the "boob tube" and the "idiot box," yet, paradoxically, the whole family always ended up in front of it anyway. And now that a preponderance of reality television treats us to real-life boobs and true idiots 24/7, we're more hooked than ever. Enter the Archos AV400 Pocket Video Recorder, a device that can record television programming and play it back on the go with an integrated 320x240 color screen. Given our nation's growing dependence on TV, it's the kind of gadget that seems essential—at least until we grow TV tuners somewhere between the kidneys and pancreas.

The AV400's predecessor, the Archos' AV300 series, was a portable video player with a proprietary connector that allowed you to plug in optional accessories like a rudimentary video recorder, a digital camera, and media card reader. The AV400 series moves the video recorder into the player itself, and ditches the proprietary connector for a convenient dock with S-video and RCA (red, white, and yellow) connectors. There are two methods of programming the recorder: You can use the device's interface to queue up tasks on the go, or you can sign up for a free Yahoo account and use its TV listings and Calendar modules to create an HTML file that can be imported to the player. Both methods are a pain, but are easier than programming ye olde VCR.

When sitting in its included dock, the AV400 charges itself and records scheduled programs using MPEG-4 compression. At the highest quality setting of 2,500kbps, the image on the player's 3.5-inch screen is gorgeous, but the relatively low resolution of 320x240 looks a little nappy when you connect the player to a larger screen, such as an external monitor or television. Although the AV400 has a relatively modest 20GB hard drive, that's still plenty of room for a handful of movies (at an overkill size of 700MB each) and television programs, with plenty of room left over for thousands of MP3s. The AV400 supports MPEG-4 compliant video playback, including DivX and Xvid, but not WMV.

No software is included to decrypt your commercial DVDs for transfer to the AV400 (which isn't surprising because said software is now illegal). But if you just happen to have DVDs that are ripped to AVI or MPEG files sitting on your hard drive, you can use the bundled freeware app *VirtualDub* to convert them for playback on the AV400. This isn't a simple task, though, and neophytes will be horrified at having to locate the proper codecs on the Internet and then configure them on their own.

Archos committed a careless oversight by not including a kickstand with the AV400. As is, we had to hold the unit or prop it up against something during playback when it wasn't in its dock. Battery life, on the other hand, gave us a big fat smiley surprise. Although Archos claims four hours of battery life on a single charge, we found this figure to be extremely conservative. We got 5:50 (hours:minutes) of continuous playback from our first charge! This absolutely stomps anything offered by our PDAs and other portable video players.

The AV400 may seem expensive, but keep in mind that you get more than just video and MP3 playback for the money. A built-in CompactFlash slot adds a humungous amount of value for both casual and professional photographers by allowing you to transfer photographs from CompactFlash cards (and other formats with an optional adapter). At $550 for the 20GB model, the Archos AV400 actually costs less than many photo viewers with smaller-capacity hard drives and no video playback.

Such are the depths of our television addiction that we cannot afford to miss even a few minutes of *Wal-Mart Shoplifters*. Will Jennifer finally get caught? Why is Bob stealing lipstick? We need answers to these questions ASAP, and Archos' AV400 Pocket Video Recorder and player makes that possible.

—LOGAN DECKER

MAXIMUM PC VERDICT 9

+ DRIVE-IN

It's a VCR, MP3 player, photo viewer, and portable video player that fits in your pocket.

– DRIVE-BY

Converting video and scheduling recordings require extensive legwork.

$550, www.archos.com

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"Handled the Rigors of DOOM3 Without Issue"
[H]ard|OCP
Doom3 Hardware Guide

"10 out of 10"
Madshrimps

"Awesome"
Steamed Turtle

"The Golden Bear & 9/10"
Bjorn3D

"Delivers on its Promise"
Adrian's Rojakpot

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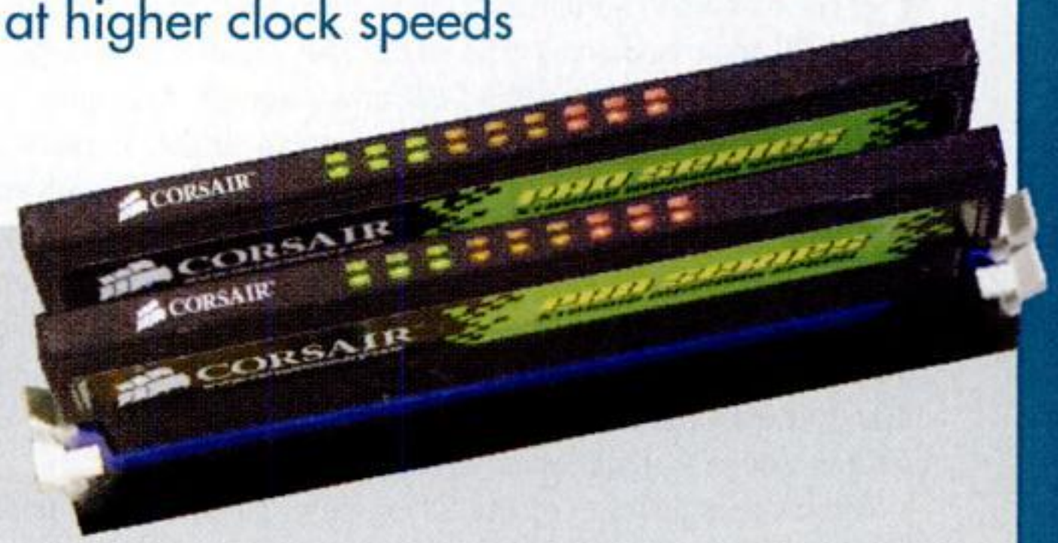

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Lite-On SOHW-832S Dual-Layer DVD Burner

Oof! Lite-On stumbles at the gate, but may still take the lead

THE BUNDLE

Ahead *Nero Express 6*
Ahead *Nero Vision Express*
Ahead *Nero BackItUp*
Ahead *Nero Showtime*

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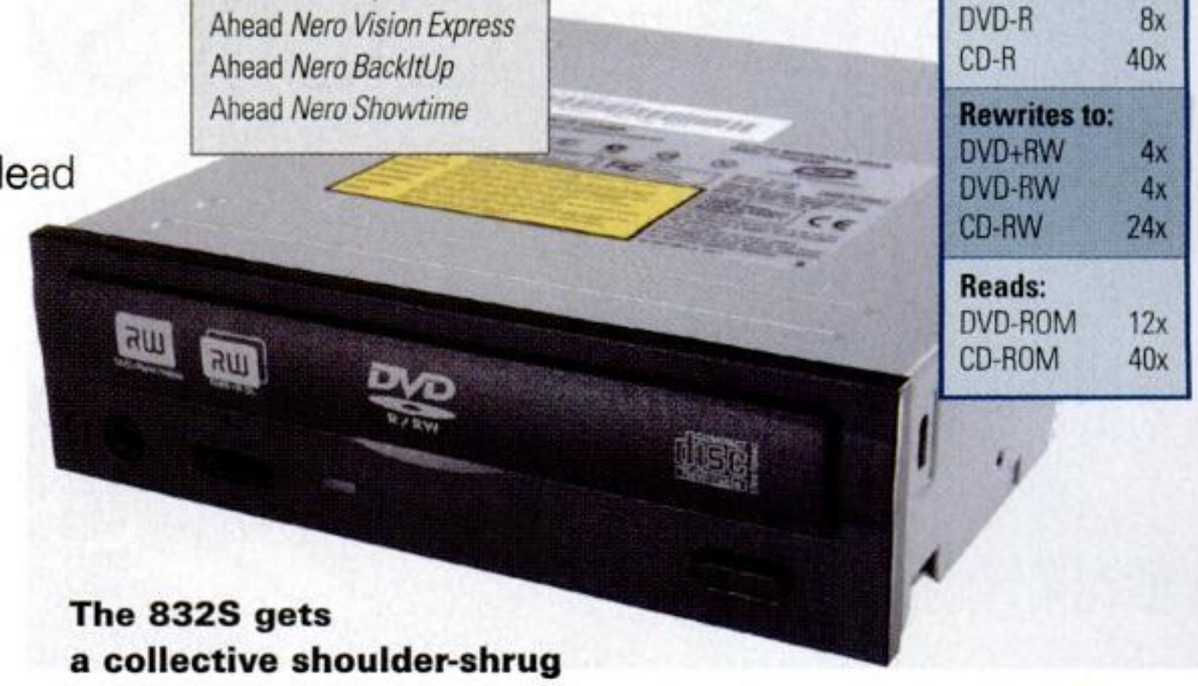
DVD+R SL	8x
DVD-R	8x
CD-R	40x
Rewrites to:	
DVD+RW	4x
DVD-RW	4x
CD-RW	24x
Reads:	
DVD-ROM	12x
CD-ROM	40x



The 832S gets a collective shoulder-shrug for its slower-than-expected speeds, but knowing Lite-On, a speed-improving firmware update is right around the corner.

Everybody knows that no matter what you do, the first pancake off the grill is going to be the worst of the stack. But as long as you're a halfway decent cook the rest will be fine. That's a gentle metaphor for Lite-On's first dual-layer DVD burner. It's not outrageously slow, but it definitely falls behind the curve of what we've come to expect from the company.

Dual-layer burners write at 2.4x speed to DVD+R media, and here the Lite-On does fine, taking 44:24 (min:sec) to burn our test disc—which is almost 30 seconds faster than the Sony DRU-700A dual-layer DVD burner we reviewed in August. This isn't a significant advantage, but we noted that after we initiated the burn, it took 38 seconds for the drive's laser to begin firing, and nearly a minute to write the lead-out necessary to "close" the burning session. This suggests that Lite-On may be able to considerably shorten dual-layer burning with some firmware work. (Like Plextor, Lite-On is very diligent about tweaking firmware—even for older drives—and posting regular updates.)

Lite-On should also pick up the pace of burning to single-layer media. The drive wrote 4.25GB of data to an 8x DVD+R disc in 10:11, about a minute longer than Sony's drive. DVD-R didn't fare any better at 10:41. Rewriteable formats were a little faster; the fastest was DVD+RW, clocking in at 13:56 to burn a full DVD.

BENCHMARKS	DVD	CD
Average data transfer (MB/sec)	8.1	4.6
Random/full-stroke seek (ms)	106/190	110/221
Audio extraction (min:sec)	–	2:48
Data DVD/CD burn (min:sec)	10:11 (DVD+R)	3:13
CPU utilization	16% (2x)	8% (8x)

**The data CD burn test uses the bundled applications to create a 700MB CD-R. The data DVD burn test uses the bundled applications to create a 4.25GB. The audio-extraction test uses a commercially stamped 74 minute audio CD. All tests were performed using Verbatim media.*

Sadly, unlike other drives, Lite-On's SOHW-832S isn't able to burn at velocities above the disc's officially rated speed, and our test dual-layer DVD-Video demonstrated less compatibility with set-top players than Sony's drive (working in three out of five players compared with Sony's four). But at least buyers receive Ahead's *Nero Express 6* suite with the drive; if you buy one, we highly recommend scooting over to the company's web site after you install the software to download the free upgrades.

—LOGAN DECKER

MAXIMUM PC VERDICT 7

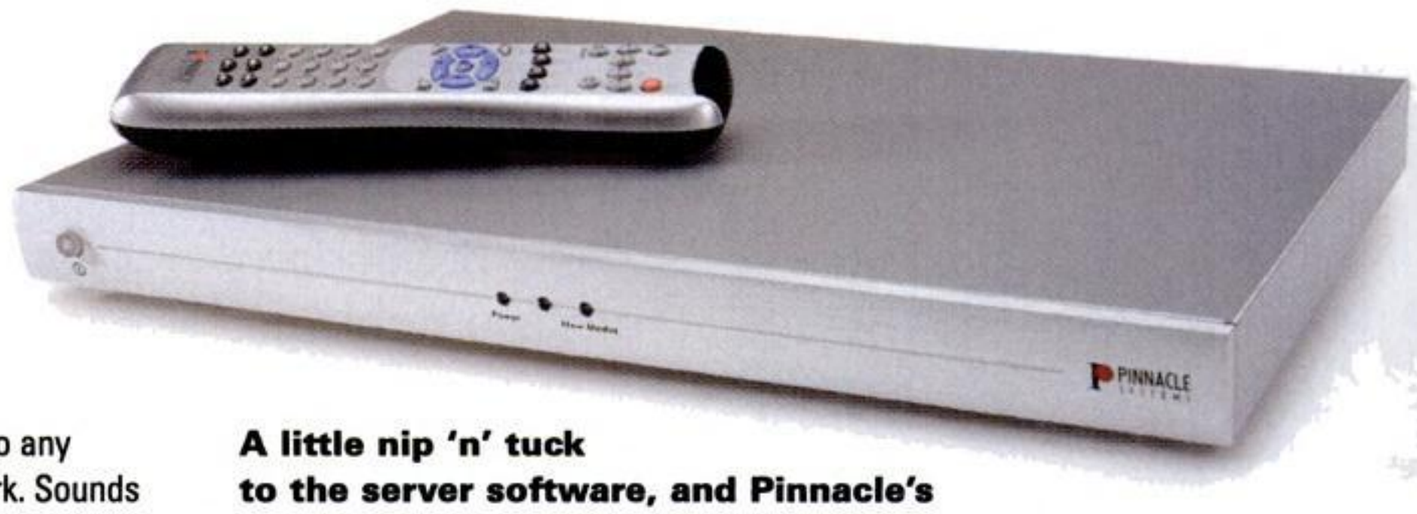
+ E-Z BAKE OVEN
Significantly less expensive than other dual-layer burners.

– DUTCH OVEN
Significantly slower than other dual-layer burners.

$180, www.liteonamericas.com

Pinnacle ShowCenter

This streaming box makes it harder than it should be



A little nip 'n' tuck to the server software, and Pinnacle's ShowCenter could be an irresistible product.

You've heard the promise of the media server, haven't you? A PC squirreled away in some discreet location that's dedicated to storing *every* CD, DVD, and image you own on its massive hard drives, and from which you stream all your content to any (or every) TV in your home courtesy of an Ethernet or Wi-Fi network. Sounds great, but up 'til now, the streaming boxes available to facilitate the process have had limited video playback capabilities. Well, that's no longer the case.

Pinnacle's new ShowCenter is one of a new-generation of streaming boxes that offer support for all the major video codecs—including DivX and other MPEG-4-based formats. Unfortunately, the product suffers from a few first-gen issues that mar an otherwise kick-ass product.

When you initially set up the ShowCenter software, it prompts you to search for media files. Conveniently, we had all our digital photos, ripped DVDs, and MP3 files stored on a single hard drive, so the server software needed to search just that drive. After the three hours it took to chew through our 1,500 digital photos, 25,000 MP3s, and handful of ripped DVDs, we were able to fire up the ShowCenter.

Movie playback kicks ass. The image quality of our ripped DVDs was indistinguishable from what you'd get with a midrange DVD player, complete with 5.1 sound and flawless images. Music playback is acceptable. It's easy to play entire selections from an artist or a particular album, but you can't easily browse album titles from within the artist category.

The photo feature is a problem. Even if you have just a single image in a folder—say, the album art that accompanies a collection of MP3 files—the ShowCenter's software will create a separate photo album for that one image. And there's no way to prevent this from happening. With 3,000 albums in our music collection, each with a piece of art, you can imagine the hell that is our photo album inventory. Our real photo albums are buried amidst thousands of albums holding nothing more than CD cover art.

Our main gripe with the ShowCenter is the subpar server software it comes bundled with. It's slow and unwieldy when dealing with even moderate-size media collections, and proved incredibly frustrating at times.

Our other gripe is that the ShowCenter's remote is uncomfortable and difficult to use. The buttons you'll use most frequently are hidden at the bottom of the unit, and the buttons you'll rarely need are in close proximity to your thumb.

—WILL SMITH

MAXIMUM PC VERDICT 7

+ MP3
If you want to stream movies to your living room, this player will do the job.

– WMA
An uncomfortable remote, ill-conceived server software, and flawed photo browsing.

$300, www.pinnaclesys.com

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Iomega REV 35GB/90GB USB 2.0 External Drive

A novel approach to removable storage that fails to impress

Iomega's new REV drive is clever because it allows you to back up data onto miniature removable storage. Unfortunately, it'll put your bank account in the red quick.

Though the industry has largely abandoned the Zip drive and its ilk, Iomega enters the scene with its all-new small-capacity REV drive, which uses 35GB removable hard drive cartridges. Unfortunately, while the REV drive offers a compelling alternative to tape drives (not that many people use them anymore), it faces much tougher competition from the recent spate of external hard drives.

To its credit, the REV drive is a clever idea. Instead of using a removable tape cartridge like the older Zip drives, the REV uses a removable miniature 35GB magnetic hard drive. The reason you see the number "90GB" in the drive's title is that it's allegedly possible to fit 90GB on one disk at the highest level of compression (2.6x). However, during testing we were unable to back up a 73GB partition with compression set to "high." Your mileage may vary.

The main issues we have with the REV is its software is buggy and it is extremely expensive. The product—which includes a single 35GB drive—retails for $400, and a single 35GB replacement drive costs $60. Compare this with a 300GB Maxtor One Touch, which costs $330. You'll see that by the time you have 300GB worth of REV disks you've coughed up more than $800.

The REV drive is compelling if you don't want to put all your eggs in one basket. You can hold images of your main drive on one disk, MP3s on another, and so on. Aiding this effort is a software bundle that includes *Norton Ghost* for drive imaging and a backup utility that lets you encrypt files and write-protect important data. We experienced a bit of weirdness during testing though, as *Norton* treated the REV drive like it was a CD/DVD. Once we wrote an image to it we couldn't write anything else to the drive nor delete any files. It even asked us to "insert another CD-R" when the drive filled up. That's just sloppy. We also couldn't get drive compression to work at all, and were bummed that you need to install the Iomega software on a PC to use the drive.

In the end, the REV drive is a slick concept that is held back by its exorbitant price and limited benefits over traditional magnetic storage options.

—JOSH NOREM

MAXIMUM PC VERDICT 5

+ IOMEGA

Very quiet, great bundle, and small removable drives offer decent speed.

– I.O.U.

An expensive proposition, and the bundled version of *Norton* is old and wonky.

$400, ($60 for additional disks), www.iomega.com

Transcend StoreJet 20GB

Not exactly a rocket, but it fits in your pocket

The StoreJet comes with a rugged carrying case that includes holes for the USB port and power LED, so the drive can be sheathed at all times.

The 20GB Apple iPod pictured here is a slick MP3 player that—oh wait—this isn't an iPod! The StoreJet sure fooled us upon first inspection. Same ivory-colored plastic shell, same chrome siding, same clean design. And because it's a USB 2.0 drive, it even includes an all-white USB cable that mimics the white earbuds included with the iPod. All in all, you could pose with it and no one would know the difference—until they asked to have a listen and discovered you had a USB cable in your ear.

The StoreJet looks like a solid white brick, with the exception of a mini-USB port on its top and a red LED on the bottom that lets you know the drive is connected and receiving power. It's bus-powered, and worked on each and every USB port and hub in the Lab without any drama to speak of.

The internal 20GB Toshiba hard drive uses a single platter that rotates at a lowly 4,200rpm, but the payoff is a drive that's dead quiet. Because of its slow rotational speed, it's not a stellar performer, but in these types of drives, performance takes a backseat to compatibility and portability. Plus, seeing as no company makes a 7,200rpm 1.8-inch hard drive, this is as good as it gets. Data transfer rates averaged about 10MB per second, which is decent, but a lot slower than larger 7,200rpm external drives.

Transcend, the drive's manufacturer, includes a limited version of a backup utility named *ExBoot* that is practically worthless for a drive this size. Who has a batch of files they need to back up routinely that is less than 20GB? Nobody at *Maximum PC*, that's for sure. *ExBoot's* initial backup routine wizard also proved maddeningly confusing. Its limited capabilities only allow you to back up entire volumes instead of performing incremental backups or backups of certain folders.

Our advice: Ditch the software and use the StoreJet as a sexy, portable hard drive. For such simple functions, it's hard to fault. If you need even more storage (we certainly do), it's also available in a 40GB version.

—JOSH NOREM

MAXIMUM PC VERDICT 8

+ IPOD

Attractive shell, decent capacity, and bus-powered.

– IZOD

Slow rotational speed and unnecessary software.

$170, www.transcendusa.com

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Home is definitely where the heart is.

Along with some spleen. And a little chunk of liver in the hall.

"Best Adventure Game of E3" - ***IGN.com***

"Forget about pushing the envelope. Silent Hill 4 tears it to pieces." - ***XBN Magazine***

"In the end, Konami's game will, without a doubt, be the preeminent scare fest of 2004." - ***IGN.com***

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Attention Geekers: Check Out These Speakers!

Two sets of 2.1 speakers enter *Maximum PC's* Thunderdome

Hey, we'd all love to have a set of 5.1 speakers, but cramped quarters and crabby neighbors can quickly spoil that party. Rather than move to the country, a better solution is to adopt a smaller, gentler 2.1 speaker system. This month we take a look at two new systems from industry-heavyweight Klipsch as well as newcomer (at least to our pages) Edifier. Both are impressive. One is a wee bit more amazing than the other.

—JOSH NOREM

Klipsch ProMedia GMX A-2.1

When Klipsch first released its GMX series in early 2003, the speakers were strictly digital, and thus offered little value to PC owners (nForce mobo users notwithstanding). The lack of analog inputs angered us, and as a consequence we gave the GMX D-5.1 set a lowly verdict of 6. We'd like to believe that, after reading our review, Klipsch's CEO bellowed to his staff, "Correct this travesty at once!" resulting in the creation of the analog-only GMX speakers pictured here. The GMX A-2.1 system has now become the benchmark for 2.1 excellence.

The primary difference between the A-2.1 and the previous non-GMX model is an all-new two-way satellite design that pivots on a ball, so you can adjust them to face up, down, left, or right. The subwoofer is also an all-new design with a rear-facing port that runs the entire width of the enclosure; as with the SWS Subwoofer and the ProMedia Ultra 5.1, controls are accessed via a large, disc-shaped pod. We're not fans of the pod for two reasons: It takes up a lot of space and the headphone jack is located on the rear, making access difficult.

During testing, one acoustical characteristic stood out: The sound feels huge, especially considering this is a 2.1 system. When we cranked up these speakers, we felt like we needed to take a few steps back to fully appreciate the quality and quantity of rich, luscious audio washing over us. Sound is projected extremely well, making for a sweet spot the size of Montana. The subwoofer peters out a bit at maximum volume, but sounds deep without being boomy at rational listening levels.

Edifier S2.1D

We'd never heard of Edifier before, so when the Canadian company offered us its finest 2.1 speaker system, we skeptically expected it to suck, and therefore eagerly agreed to a review. But lo and behold, the S2.1D doesn't suck. In fact, it's actually pretty darn good.

The S2.1D certainly looks nice, sporting an aesthetic that's classic "Hi–Fi," with MDF enclosures and removable speaker grills for both the satellites and subwoofer. Each two-way satellite is spec'd to pump out 20W apiece, with the 6.5-inch subwoofer reported to deliver 40W RMS. These numbers aren't super impressive, but what's most important is how they sound. An interesting twist: These speakers offer both analog and digital inputs, including both coaxial and optical (an optical cable is even included). Controls are accessed via a wired remote that lets you adjust volume, bass, treble, loudness (think Hi-Fi) and balance. The controls are easy to use and we appreciate being able to adjust both treble and bass. Unfortunately, these speakers have one fatal flaw—they lack a headphone jack. As apartment dwellers, we use headphones frequently, so this is a glaring omission.

In Lab tests, the speakers performed admirably. Compared side-by-side with the Klipsch speakers on this page, they offered a bit more treble but not quite as much bass. The result was astounding high- and midrange clarity at normal volumes, but a lack of bass response at higher volumes. Furthermore, the satellites didn't project sound as well as the ProMedias, and the subwoofer is just not quite as powerful as we like—bass tones tapered off at about 60Hz or so, and increasing the volume all the way resulted in distortion from both the satellites and subwoofer.

The Edifier system isn't quite as powerful or as elegant sounding as the ProMedia, but it is $50 less expensive.

We weren't big fans of Klipsch's digital-only GMX speakers, but this new analog version is the dog's bollocks.

Klipsch ProMedia
MAXIMUM PC VERDICT 9

MEOWERS
Fantastic fidelity and amazing power.

WOOFERS
Control pod is too big, and headphone jack is hard to access.

$150, www.klipsch.com

Edifier's speakers, which cost just $105, look and sound like speakers that cost twice as much.

Edifier S2.1D
MAXIMUM PC VERDICT 8

HAWAIIAN WEATHER
Exceptional sound, plenty of input options, and great value.

HAWAIIAN FOOD
Subwoofer lacks headroom, and a headphone jack is not included.

$105, www.edifier.com

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Altec Lansing AHS602

This headset's beauty is marred by a few ugly warts

The Altec Lansing AHS602's attractive styling can't mask its disappointing bass response and imperfect audio output.

When we first received the Altec Lansing AHS602 headset, we marveled at how attractive it looked in its packaging. We were especially impressed by its large headphone speakers, comfortable looking headband, and shiny silver accents. Unfortunately, this attraction quickly turned into horror when we extracted the AHS602 from its packaging and discovered an inline remote the size of a small Caribbean island attached to the headset's wiring. It's not that we're opposed to the idea of an inline remote—when properly designed and implemented, it can be an indispensable feature—but this one is way too clunky.

To be fair to Altec Lansing, a functional reason exists for the remote's presence and size. It not only contains the volume controls for the headphone and the microphone, but also acts as the battery pack that powers the headset's integrated SRS Headphone technology. The SRS effect is an audio enhancement standard that is supposed to improve the listening experience in two ways: first, it adds spatial positioning to simulate surround sound effects; and second, it bolsters the device's soundstage, leading to fuller-sounding audio.

This all sounds great in theory, but in practice the AHS602 falls short. For instance, while the normal audio output of the AHS602 sounded decent in our subjective listening tests, it left us disappointed with its weak bass production. Activating the SRS effect did have a positive effect on the audio output and led to greater fidelity and a discernible surround sound field. Unfortunately, even with SRS on, the bass still left something to be desired. We also noticed that the SRS rendered certain sound effects at high volume—such as shotgun blasts—intolerably harsh and piercing to our ears. Furthermore, raising the volume past the midway point made the audio crackle in games like *Doom 3*.

Not everything about the AHS602 is disappointing. As we said, remote notwithstanding, it's attractively styled, and the microphone performed admirably in our tests, offering good pickup and response. However, these positives don't make up for the AHS602's lackluster audio performance.

—TAE K. KIM

MAXIMUM PC VERDICT 6

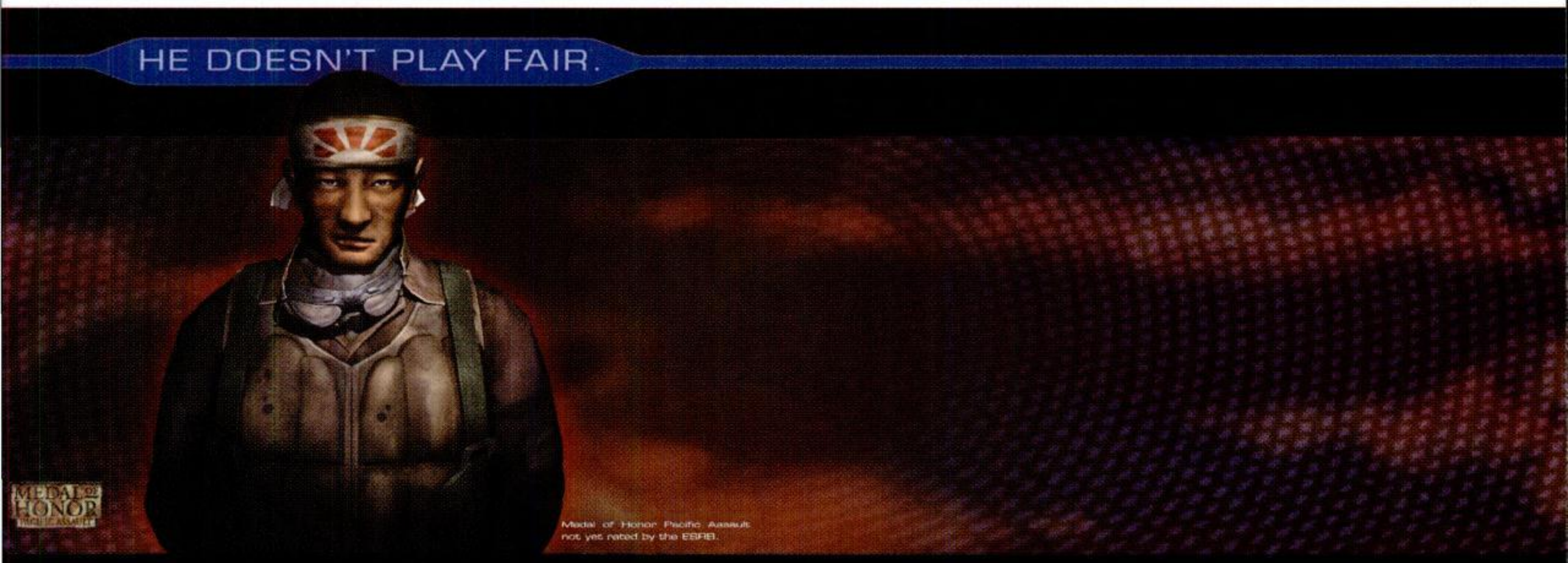
DETROIT PISTONS

Attractive design, and good microphone performance.

DETROIT TIGERS

Anemic bass output, bulky remote, and imperfect SRS effect.

$100, www.alteclansing.com



WHY THE HELL SHOULD YOU?
The Klipsch ProMedia Ultra 5.1 gives you the edge. This surround system not only puts you in the middle of the action, but may very well be the difference between victory and certain death. Cues in many of your favorite games, including EA GAMES™ Medal of Honor Pacific Assault,™ are tested on Klipsch speakers. Developers choose Klipsch because of the Ultra 5.1's uncanny ability to reproduce all the game's detail and dynamics-from the soft breath of an enemy sniper to the apocalyptic explosion of the USS Arizona.
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Klipsch

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Canon EOS ID Mark II

Dual CPUs make this the Ferrari of digicams

The Mark II is the first dual-processor digital camera we've seen, and also features a RAID approach to data storage.

If Canon's new pro-oriented digital camera had a mantra, it would have to be "I can't drive 55," because this Mk II follow-up is easily the fastest camera the Maximum PC Lab has ever seen.

Consider its burst performance: It can shoot up to 40 shots at 8.5 frames per second at an 8.2-megapixel resolution. The next-closest digital SLR body is Nikon's D2H, which buffers 40fps, but at just 4 megapixels. In contrast, the Mk II's predecessor—the EOS 1D—could buffer only 20 shots. To capture 70 megapixels of data per second, Canon has jammed roughly half a gig of DDR RAM into the body.

Auto focus performance, which was already outstanding in the original 1D, receives a major upgrade here thanks to dual 32-bit CPUs. Instead of using a single CPU to run the focus detection points and AF, the tasks are now split between two RISC chips. The resulting performance is nothing short of astonishing. We used the camera to shoot a variety of scenarios from a soccer game to a formal wedding, and the Mk II tracked all our subjects with aplomb.

Inside the Mk II is a Canon-designed and -fabricated CMOS sensor that offers exceptionally clean images at ISO speeds of 800 and higher. Although the Mk II offers just 2 megapixels of additional resolution, its photos look significantly better and more detailed than those taken with the prosumer Canon EOS 10D, which has a reputation for producing amazingly clean, grain-free images at high ISO ranges.

The other big news is that this is the first digital camera we've seen to feature a RAID approach to storing photographs. Fill both the SD and CF slots in the Mk II, and the camera will write an image to both cards. If one card is corrupted, you've got a full backup on the other card. Or alternatively, you can choose to use the second card as auxiliary storage should the primary card fill up. Unfortunately, the interface for implementing either option is clumsy. Finally, Canon fixed a flaw that plagued its earlier digicams: The Mk II will continue writing images even if the CF door is opened during the process.

But not all is perfect in Mark II land. Our testing indicates that this camera is particularly sensitive to reds—if you overexpose a red object in certain conditions, the colors turn practically fluorescent. This problem manifested itself most frequently when shooting in late afternoon sun with the camera set to auto white-balance. We corrected this relatively minor problem by paying close attention to outdoor conditions and the camera's settings.

We also feel obligated to note that the camera appears to do very little sharpening of images by default, which can make the raw photo output feel a little soft. It's likely Canon made this choice because professionals and power users favor the more sophisticated post-processing and sharpening of *Photoshop* over in-camera sharpening. The merits of such a decision are open to debate, but we would have preferred a bit more automated sharpening.

Unlike Nikon, which is waving goodbye to FireWire, Canon maintains FireWire A and now adds a USB 1.1 port for direct output to photo printers. On the other hand, after lugging this tank of a camera around for a month, we found ourselves wishing Canon had dumped its old nickel metal hydride batteries in favor of Li-Ion. We understand the logic of using the same battery that's in Canon's two other pro bodies, but a Li-Ion would have definitely lightened the load. With its magnesium shell, battery, and attached fast zoom, this camera should come with a chiropractor. But hey, that's the price you pay for this much performance and durability.

—GORDON MAH UNG

SPECS	
Resolution	8.2 megapixel (3504x2336 pixels)
Lens compatibility	Canon EF system
Shutter	30 sec. to 1/8000 sec. (including bulb)
X-sync	1/250
Weight	54.8 oz. with battery
Continuous shooting	8.5 fps
Burst rating	40 JPEGS at ISO 100 (20 in RAW mode)
Storage	Type I and II Compact Flash and Secure Digital
Auto focus system	45 AF points at 0 to 18 EV
Battery	Ni-MH good for 800 to 1200 shots

MAXIMUM PC VERDICT 9

+ 4 X 5

A wonderful viewfinder and tons of speed make the Mk II the top gun of digital cameras.

– KODAK DISC

Feels like an Abrams tank slung around your neck.

$4,500, www.canon.com

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Xpider II

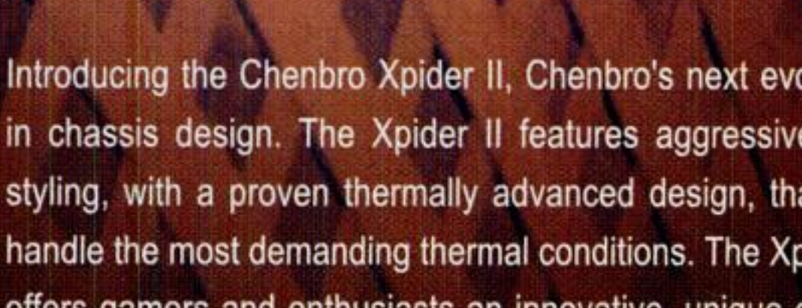
By Gamers, For Gamers

Powering the Gamer's Dream Machine

- Aggressive Styling
- Proven Thermal Design
- Screwless Assembly
- Innovative See-Through Side Panel
- Intel Prescott™ & AMD Athlon 64/FX Ready

Introducing the Chenbro Xpider II, Chenbro's next evolution in chassis design. The Xpider II features aggressive new styling, with a proven thermally advanced design, that can handle the most demanding thermal conditions. The Xpider II offers gamers and enthusiasts an innovative, unique design coupled with support for the latest CPUs including the new Intel Prescott and AMD Athlon 64/FX series. Gamers and PC enthusiasts seeking the ultimate gaming system will be attracted to Xpider II's configuration flexibility and innovative design at a price that will not break the bank. See the new Xpider II at your authorized Chenbro dealer.

Color Options



Red Blue White Green

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LaCie Bigger Disk

A humongous, no-frills hard drive that delivers the gigs

Think you have a big disk? So did we, until we received LaCie's enormous Bigger Disk for review. It's touted as the biggest disk drive available, and we're inclined to agree, though it's actually four 250GB drives spanned together in a nifty aluminum alloy enclosure as opposed to a single terabyte disk. No matter, because it's still the highest capacity external USB/FireWire hard drive we've ever seen.

If you're unfamiliar with drive spanning, it essentially means that data is written to one drive first until it is full, then the next drive, and so on until the entire thing is full. If you're worried about thermal issues, don't be. The Bigger Disk includes its own cooling apparatus that spins up and down as needed to keep the drives cool. During testing there was an almost continuous stream of lukewarm air shooting out the exhaust port on the unit's backside, and the aluminum shell's temperature never became warm enough to warrant concern.

So, what do you do with this drive? Say goodbye to capacity concerns and fill 'er up. No backup software is included, because the drive isn't being marketed as such, so all you have to do is begin downloading, ripping, and copying anything and everything in sight. We've found that the LaCie Bigger Disk makes for an ideal media storage drive, as it can store more than 100 hours of HDTV, 250 ripped DVDs, or literally tens of thousands of MP3s and pictures.

In Lab tests, transfer speeds averaged a respectable 22MB per second using the USB 2.0 interface. FireWire speeds were a smidge faster, though we used the slower 400MB interface rather than the rare FireWire 800 ports (of which there are two). There's also an "auto on" function that intelligently turns the drives on and off when necessary, but unfortunately it's only available for Mac users.

No buttons, software, or gizmos adorn LaCie's Bigger Disk—just 930GB of storage waiting to be deflowered.

While we're impressed with the product's capacity (a 1.6TB version is also available), we're disappointed that it doesn't come bundled with any software whatsoever. Given the Bigger Disk's steep cost, some rudimentary backup or video-editing software would have made it a more compelling package.

—JOSH NOREM

MAXIMUM PC VERDICT 8

+ TERABYTE
Huge capacity, and includes cooling fans.

− OVERBITE
No software bundle.

$1,200, www.lacie.com

Apple iPod

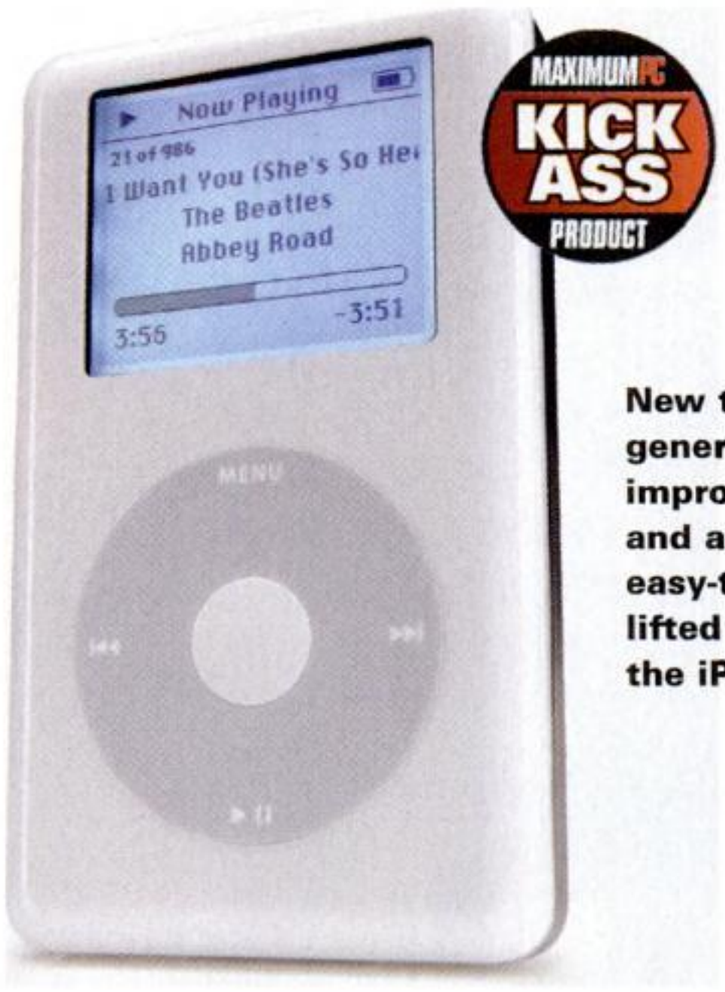
The Lance Armstrong of MP3 players wins again

If you don't like ballet, it's likely that the only possible enjoyment you get out of watching a performance is in wondering when one of the dancers is going to screw up and land with a spectacular thud on the stage. It's kind of like that with Apple's iPod: It's a product so graceful and talented, we can't help but watch in mesmerized fascination to see how the next iteration will screw it all up. But alas, Apple has once again pulled off another *grand jete* that leaves us feeling breathless.

The major update to the 4G (fourth-generation) iPod is that the hardware interface adopts the design of the iPod Mini, placing the four control buttons of the 3G version—reverse, menu, play/pause, and fast-forward—directly on the touch-sensitive click wheel. This design was a necessary space-saving innovation on the Mini, but it turned out to also be an improvement over the original. Not only is it easier to control all the functions of the iPod with one hand, but feeling the click of the iPod's scroll wheel also gives you tactile feedback when you press a button.

The other improvements are subtle, but nonetheless brilliant. If your headphones get snagged or yanked out, for example, the iPod graciously pauses music playback. This feature also comes in handy when switching between earbuds and external speakers or an FM transmitter. The 40GB model is slightly thinner than the 3G 30GB iPod, but the 20GB we reviewed is even slimmer still. Battery life has improved as well; in fact, it improved over the span of our tests, initially lasting a little more than nine and a half hours, but eventually sustaining slightly less than 12 hours (as advertised) as we were wrapping up testing.

Our gripes are pretty much the same ones we've voiced since the original iPod was released. We'd love to see a custom parametric equalization option with at least five bands to tweak, and the option to associate custom settings with specific songs and playlists. A removable battery would also go a long way toward reassuring potential converts about the iPod's longevity. And although the 4G iPod supports Apple's proprietary lossless compression format, would it kill Apple to support the open-source OGG and FLAC standards? We think not.



MAXIMUM PC KICK ASS PRODUCT

New to the fourth-generation iPod: improved battery life and a brand-new, easy-to-use interface lifted directly from the iPod Mini.

—LOGAN DECKER

MAXIMUM PC VERDICT 10

+ AN APPLE A DAY
An improved interface, better battery life, and smaller size than previous models.

− DOCTOR'S OFFICE
Still lacks parametric EQ, removable battery, and open-source format support.

$300, www.ipod.com

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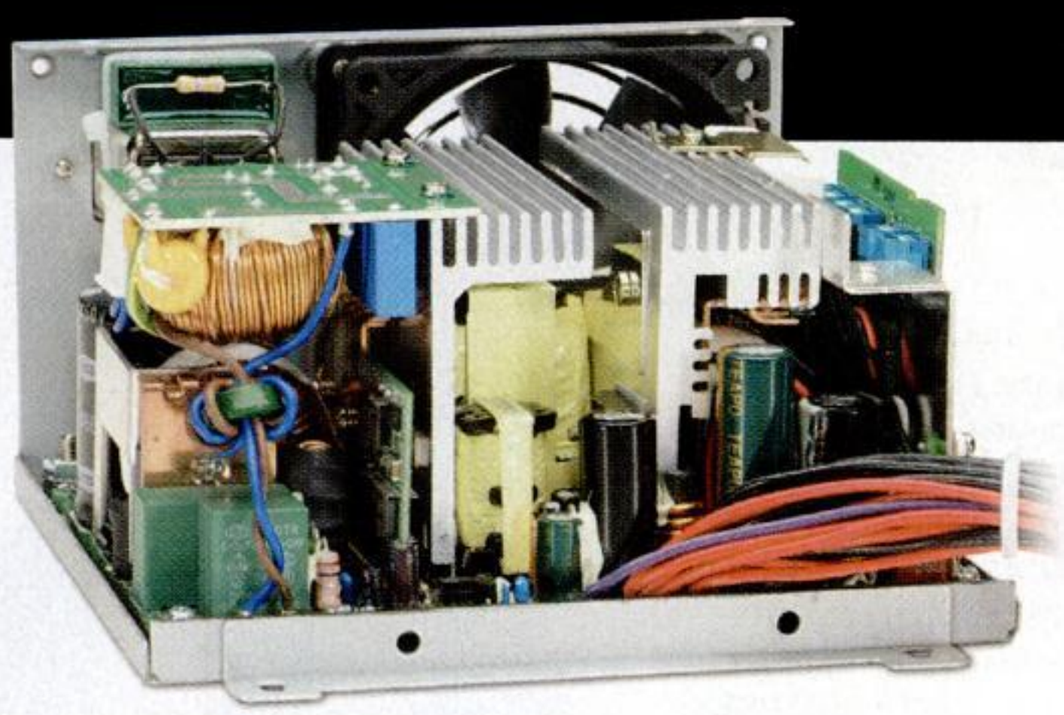
GETS DOWN

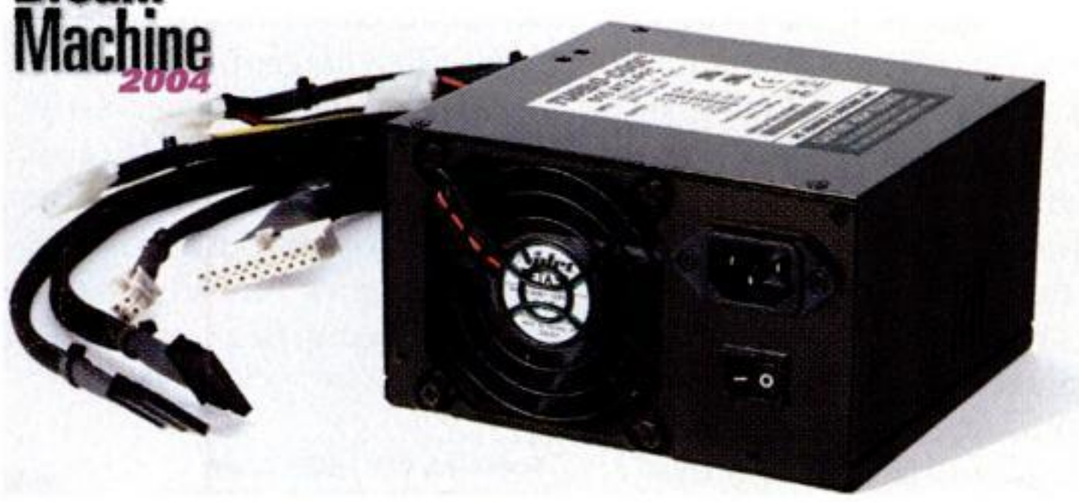
LETS YOU DOWN



Turbo-Cool® 510 Power Supply

So-Called "550" Power Supply

Power @ 25°C:	**600W**	**550W**	Rating requires room temp. < 55°F
Power @ 40°C:	**550W**	**366W**	40°C is a typical power supply temp.
Power @ 50°C:	**510W**	**244W**	50°C is the spec for a commercial PC
+12V Output:	**34A/38A**	**24A**	**50% more power for CPUs and drives**
Regulation:	**1%**	**5%**	**Turbo-Cool's voltages are 5X tighter**
Ripple:	**10mv**	**50mv**	**Turbo-Cool's outputs are 5X cleaner**
Max. Cooling:	**44 cfm**	**40 cfm**	Tests show "550's" 2nd fan is ineffective
Active PFC:	**Yes**	**No**	Continuous range line conditioning
Voltage Pots:	**Yes**	**No**	Adjustments for system fine tuning
Intel Listed:	**Yes**	**No**	Turbo-Cool 510 tops Intel's ATX12V list
Warranty:	**5-Years**	**1-Year**	Reliability and longevity indicator



- **Check Our Website for *Ten* 510 Reviews!**
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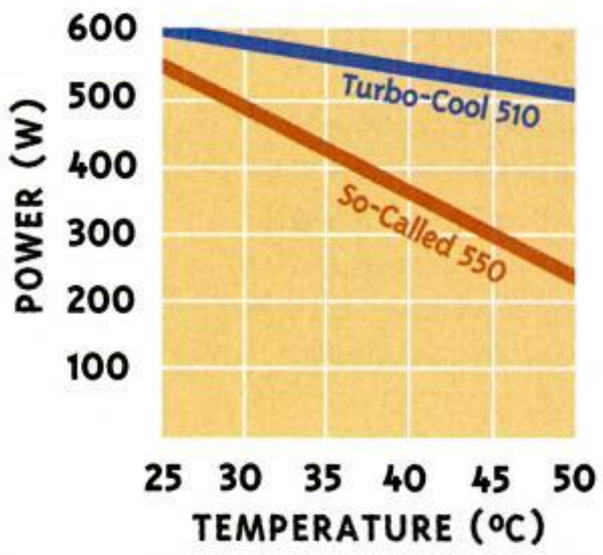
Don't be Misled by Wattage Claims!



*Even though the ambient temp. in a power supply is at least 40°C (104°F), most manufacturers unrealistically assume 25°C (77°F) in order to exaggerate their wattage claims. Since the proper full-load rating is 15°C higher, these power supplies produce **33% less power than their advertised ratings** as shown on the derating chart.*

Turbo-Cool 510 operating temperature spec: *full load @ 50°C.*
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Mouse Meet 'n' Greet

It takes more than good looks to win the hearts and hands of gamers

For some strange reason, mouse manufacturers occasionally confuse their product with Adidas sneakers, and insist on embellishing the PC peripheral with fancy, industrial, "designer" features. The Microsoft S+ark and Logitech MX1000 Laser are two such examples. While one mouse emphasizes form over function and falls flat, the other melds funky flare with stunning performance.

—WILL SMITH

Microsoft S+ark

Normally, devices that are silver, shiny, and lit in a fancy manner make the Maximum PC Lab denizens hoot and holler like chimpanzees. Sadly, though, no number of bells or whistles could save Microsoft's new unwieldy anachronism of a mouse from our wrath.

Problem number one: The S+ark's egg-shaped form-factor casually dispenses with any and all notions of ergonomic efficiency. It looks great on paper, but it's a pain in the hand, especially during long mousing sessions. This is particularly surprising coming from the maker of the Intellimouse Explorer 4.0—one of the most comfortable mice we've ever tested.

Fancy, newfangled, industrial design only impresses us when it complements the function of the device—not impedes it.

Problem number two: The S+ark has fewer features than the Intellimouse Explorer. It includes just three buttons (if you count the clickable scroll wheel), and the scroll wheel is a standard design, not the nifty new tiltable type featured in the latest version of the Intellimouse Explorer.

Problem number three: The clickable area of the primary mouse buttons is much too large. On the S+ark, the buttons are made of a solid piece of plastic, just like many of the newer MX mice from Logitech. But while Logitech makes just the front third of the mouse button clickable, the S+ark's buttons are clickable for almost two-thirds of its length, making inadvertent—and inconvenient—clicks a frequent problem.

The S+ark's futuristic lighted tail-strip hardly makes up for its poor ergonomics and unfortunate design. The mouse has one positive attribute: It's ambidextrous. But if we were southpaws, we'd learn to mouse right-handed before we'd use this product.

Microsoft S+ark

MAXIMUM PC VERDICT 3

+ APPLE IPOD

It works for righties or lefties!

− NOKIA 3650

Uncomfortable design and over-sensitive buttons suck. Where's the tilting scroll wheel?

$40, www.microsoft.com

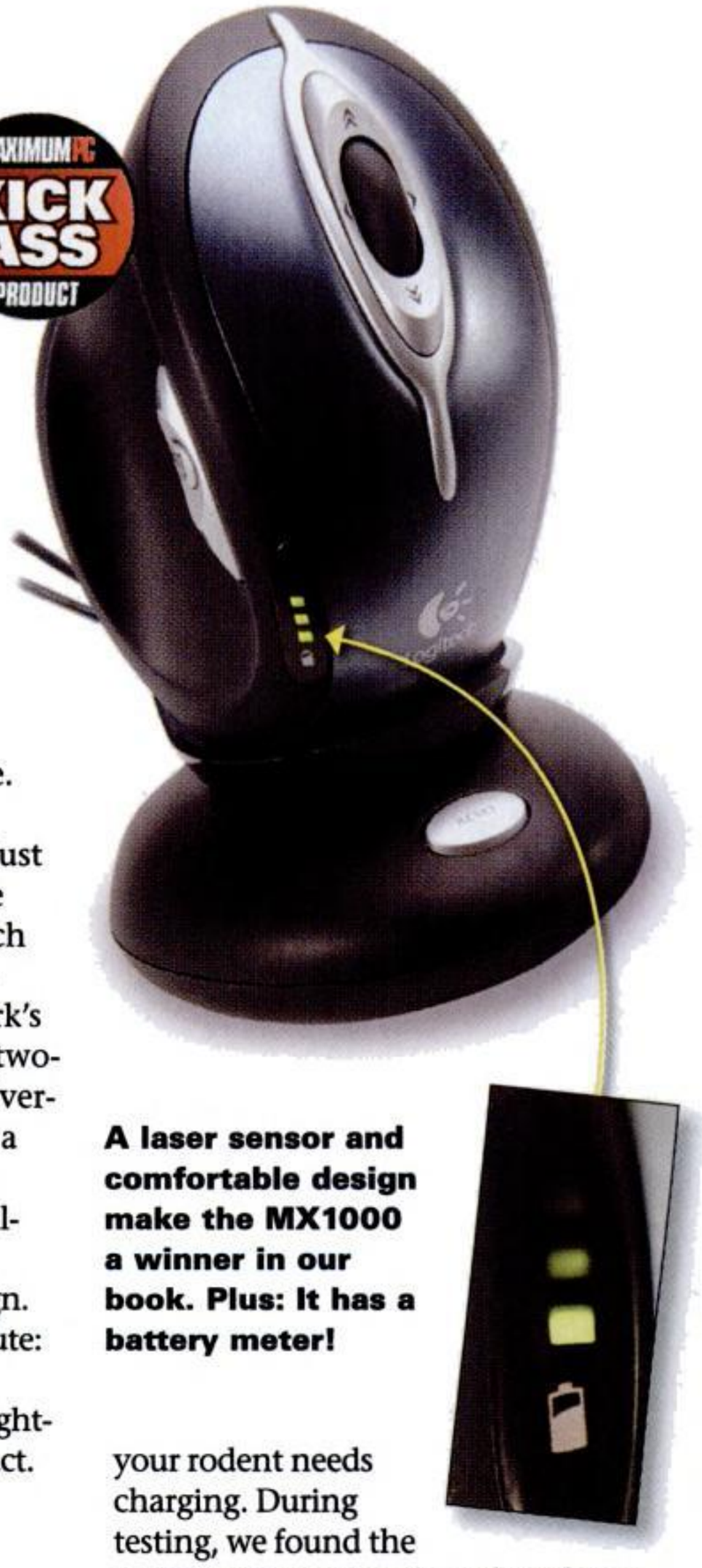
Logitech MX1000 Laser

We've been using optical sensor mice for the better part of a decade. Minor improvements to the optical sensor technology have improved resolution and update speeds, but we've seen no real revolutions—until now. Logitech's latest offering, the MX1000 Laser, represents the first significant technological advance since Microsoft released the first optical mouse way back when.

Logitech's secret is laser lights. Instead of using a simple LED to illuminate the surface beneath the optical sensor, the MX1000 uses an infrared laser. Logitech claims that because the photons in a laser beam are aligned, it produces a sharper image than an LED. This lets you mouse on less-detailed surfaces—like glass—that have previously been un-mouseable. It also makes the mouse's movements more precise, which our Lab tests corroborated.

The MX1000 is wireless, with built-in lithium-ion batteries that are good for three or four weeks of regular use. We especially like the battery meter, which tells you when your rodent needs charging. During testing, we found the mousing motion so smooth it almost felt as though the cursor was floating. And while the super smoothness takes a little while to adjust to, once we did, we found it difficult to go back to a standard optical mouse. The MX1000 is amply equipped with eight buttons and a tiltable scroll wheel, although only four of the buttons are comfortably usable for gaming.

With the MX1000's low latency and high degree of precision, Logitech has produced yet another mouse that's suited for gamers. It's expensive for a device that will be regularly exposed to the perils of a PC geek's desktop, so cost-conscious consumers may want to hold out for the less expensive wired version that's expected to ship in a couple months.



A laser sensor and comfortable design make the MX1000 a winner in our book. Plus: It has a battery meter!

Logitech MX1000 Laser

MAXIMUM PC VERDICT 9

+ LASERS

Long-lasting Li-Ion battery, and top-notch optical-sensor precision.

− TASERS

The battery isn't user-replaceable.

$80, www.logitech.com

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Keyspan USB Server

A remote USB hub for your entire network

Easily share your USB printer and scanner on your network with the Keyspan USB server.

Can't afford an expensive networked printer, scanner, or network-attached storage device? Then you should check out Keyspan's unique approach to networking your USB devices. The company's USB server gives you a workable alternative to good old-fashioned sneaker net.

In a nutshell, the Keyspan lets you share USB printers, scanners, and peripherals across your network using a single four-port Fast Ethernet device. And although Keyspan doesn't say the device is designed for it, we also successfully shared a Plextor external DVD burner, DiskOnKey USB key, and USB-powered hard drive from the device.

While the USB Server is certainly useful, operation of the device could be improved. To access a device on the network, you have to install client software on each PC. To scan something, you have to manually go into the client and connect the device. While it's connected, no other computer can access the scanner until you disconnect it. The same goes with printers—although a new version of the software promises to connect and disconnect printers on demand.

The weakest link of the Keyspan, though, is its speed. It's limited to 12Mb/s Full Speed USB. That makes for some pretty painful wait times if you're trying to copy large files. Keyspan says cost is the reason for the limitation. Hitting the maximum 480Mb/s USB speed would require a bigger processor, which would boost the USB Server's cost.

One advantage of the USB Server is that it transmits data back to the computer in addition to receiving data, which is what makes it compatible with scanners and sets it apart from a Wi-Fi server. The only problem is that you can't be sure it will work with all your devices. Keyspan should have included a list of printers and other USB devices that have been certified to work with the USB Server. As it stands, it's a crap shoot. While our Canon USB-powered scanner worked, a USB-powered Pockey hard drive did not.

The USB Server may be a niche item, but we appreciate its novelty. USB 2.0 support and more robust software would only make it a more promising category.

—GORDON MAH UNG

MAXIMUM PC VERDICT 7

+ USB 2.0
Lets you eliminate some sneaker net tasks like printing and scanning.

– USB 1.0
Too slow to support large data transfers; doesn't support USB hubs.

$130, www.keyspan.com

Magix Music on CD & DVD

Slow and buggy beats conceptually innovative

Magix *Music* allows you to transfer hours of music onto DVD and play it in your living room DVD deck.

Magix's *Music on CD & DVD* is one of those ideas that is so simple, you wonder why it wasn't put into action sooner. Seeing as most people have their living room DVD players hooked up to multichannel speakers, why not harness the DVD deck's power to play digitally compressed music?

Many new DVD players are capable of playing MP3s, but the majority out there still can't. To get around this, *Music on CD & DVD* enables you to encode your MP3, Ogg Vorbis, WMA, or WAV files to a standard MPEG audio stream that any DVD can read. Special effects and *Windows Media Player*-style visualizations can even be added to the DVD. (Of course, they'll eat up space on the disc.) With visuals and standard compression, we were able to pack just less than four hours of music onto a disc. Magix trumpets the ability to burn 100 hours of music onto DVD—if the files are saved as MP3 data. Um, we could already do that with *Nero*.

One unique touch is that the program gives you the option of filtering and re-encoding music for surround sound systems. With these effects in place, songs are re-encoded at 384kbps; you have the option of lowering it but not raising it.

While Magix gives you a ton of features and capabilities—you can de-hiss, de-noise, and tweak other audio effects for songs—the program's interface is cluttered and awkward. We had to dig around to find the features we wanted to adjust. Worse yet, even on our zero-point Athlon 64 FX-51, the encoding was painfully slow. A 2.8GHz Pentium 4B was equally chuggy when encoding our compilations, making this operation more of an afternoon or overnight affair, not something quickly performed on the fly. Worst of all, however, is a nasty bug we encountered that prevented us from successfully copying more than 40 of our test songs at a time. D'oh!

Music on CD & DVD is interesting because we haven't seen a commercial application with this capability before. Unfortunately, it has so many rough edges that we're forced to knock it down a few points. Still, if you want to create audio DVDs, this is the only show in town.

—GORDON MAH UNG

MAXIMUM PC VERDICT 5

+ VINYL
Burns your music to DVDs that can be played on any DVD deck.

– CASSETTE
A little buggy. Gave us problems after 40 tracks.

$40, www.magix.com

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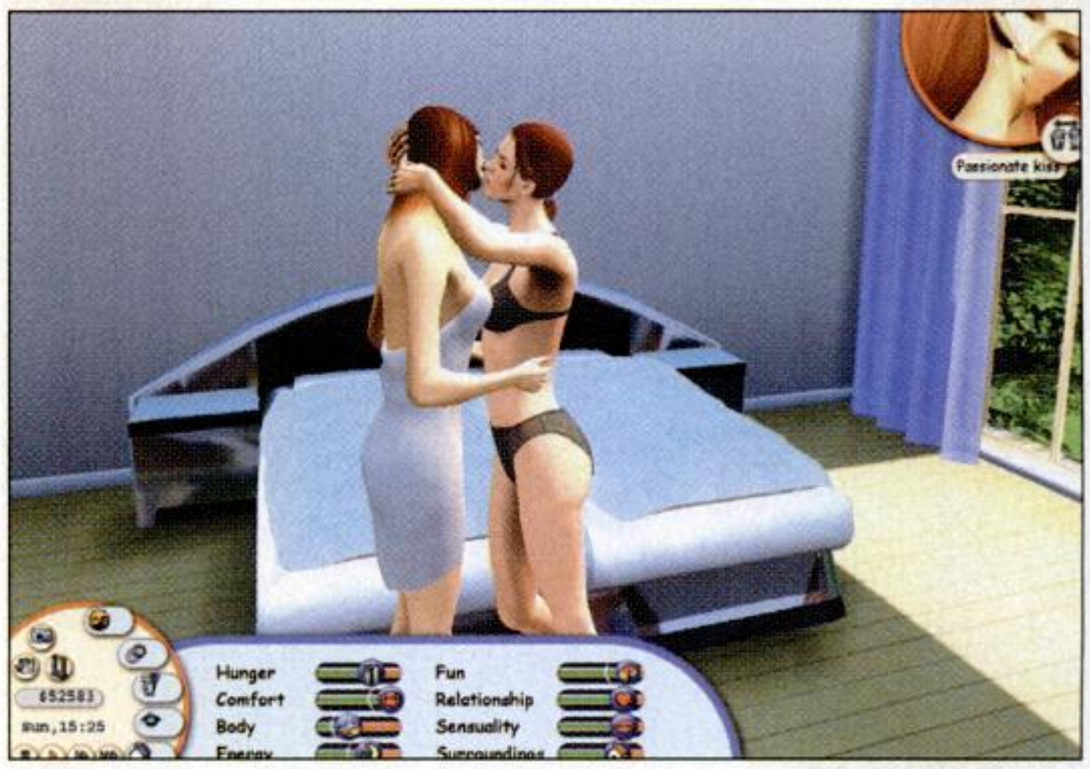
Singles: Flirt Up Your Life

If you thought gonorrhea was a drag, try this



Things are heating up at the Olsen twins' household.

If you can recall the crushing disappointment of hatching your first batch of Sea Monkeys, you have a pretty good idea of the experience offered by *Singles*.

The objective of *Singles* is simple. Through an interminable campaign of mouse-clicking, you attempt to help two roommates overcome the common-sense barrier of not sleeping together until they can no longer help themselves, at which point they jump into bed for an embarrassing 22-second grapple beneath the comforter. That's it. Whee. Pass the champagne.

You begin by choosing two characters from a cast of 16—eight men and eight women ranging from urban temp worker to goth weeny. They can be any race as long as they're Caucasian. You can put two guys or two girls together as long as one of them is either James, the guy who "preferred dressing up his sister's dolls to playing with his toy train" or Shannon, the "professional athlete." Believe it or not, things actually go *downhill* from here.

The advertisements and promotional screenshots coyly suggest—without ever actually saying so—that *Singles* is *The Sims* gone full-frontal, but don't believe it. The entire game revolves around dish-washing, teeth-brushing, snack-feeding, and robotically ordering your characters to flirt with each other over and over again until they feel comfortable revealing their naughty polygons to each other. The game's obsessive, single-minded purpose of humping your roommate prevents it from even being an enjoyable sandbox experience like the game it's ripping off.

If you've seen a single episode of *Sex in the City* or *Queer as Folk*, you've seen way more action than you'll ever see here. In fact, it's bizarrely tame for an "adult" title. Where are the drunken antics that end up in accidental homosexual experiences? Or the wild parties that begin with a hit of Ecstasy and end in a palimony lawsuit nine months later? Strangest of all, however, is the complete absence of any sense of humor or playfulness that might have provided some relief from queuing up "sweet talk" orders for hours on end. Where's the condom mini-game? Where are the challenging *Sim City*-style disasters (*"Psychotic Ex-Girlfriend!," "Herpes Outbreak!"*)? There's not even multiplayer—not even four-play!

We'll concede that visually-speaking, *Singles* looks pretty good. Your environment and furnishings are three dimensional, and you're free to pan around, adjust the viewing angle, and zoom in and out (no pun intended). But so what? If sex were this boring, we'd choose abstinence.

—LOGAN DECKER

MAXIMUM PC VERDICT 3

+ NVIDIA

You can't contract venereal disease from just playing a game.

– CHLAMYDIA

On the other hand, the game is such a drag that a clinic visit might be more fun.

$30, www.eidos.com

Missing: Since January

An interesting premise leads to an uninteresting adventure game

This is one of the few puzzles in the game that didn't make us want to pull out our hair in frustration: To solve it, simply drag the knife into the hand.

To paraphrase Mark Twain, reports of the adventure game's demise have been greatly exaggerated. Recent titles such as *The Longest Journey* and *Syberia 2* proved that there was still some fun to be had with point-and-click adventures, and genre stalwart The Adventure Company tries to keep the ball rolling with its latest release: *Missing: Since January*. Previously released in Europe by Ubisoft as *In Memoriam*, *Missing* is an interesting and novel take on an established formula that ultimately falls short.

The premise of *Missing* revolves around the disappearance of a journalist and his partner at the hands of serial killer. Named The Phoenix, the murderer releases a CD-ROM that contains clues to the couple's whereabouts. This is where you come in. Gamers are challenged to unlock the mystery by solving a series of puzzles using their wits, Internet search engines, and their own e-mail accounts. Internet access is a game requirement and is seamlessly integrated into the experience. Using Google and other real-life Internet tools definitely makes the gameplay feel more viscerally immersive, so much so that we believe it to be a glimpse of the genre's future.

Unfortunately, the rest of the experience isn't as praiseworthy. The majority of the puzzles are overly vague and teeth-gratingly difficult, and the only reward for solving them is full-motion video clips that are uninteresting and bland, despite the fine performances of the featured actors. Even more disappointing is the game's lackluster, anticlimactic ending.

Missing: Since January is an interesting but flawed game that will appeal to hardcore adventure gamers or those with a strong interest in the occult. Gamers who have only a passing interest in the genre, however, should turn elsewhere for their point-and-click fix.

—TAE K. KIM

MAXIMUM PC VERDICT 6

+ FOUND MONEY

Interesting premise and good integration of the Internet.

– LOST KEYS

Uninteresting story, and overly difficult, vague puzzles.

$20, www.theadventurecompany.com

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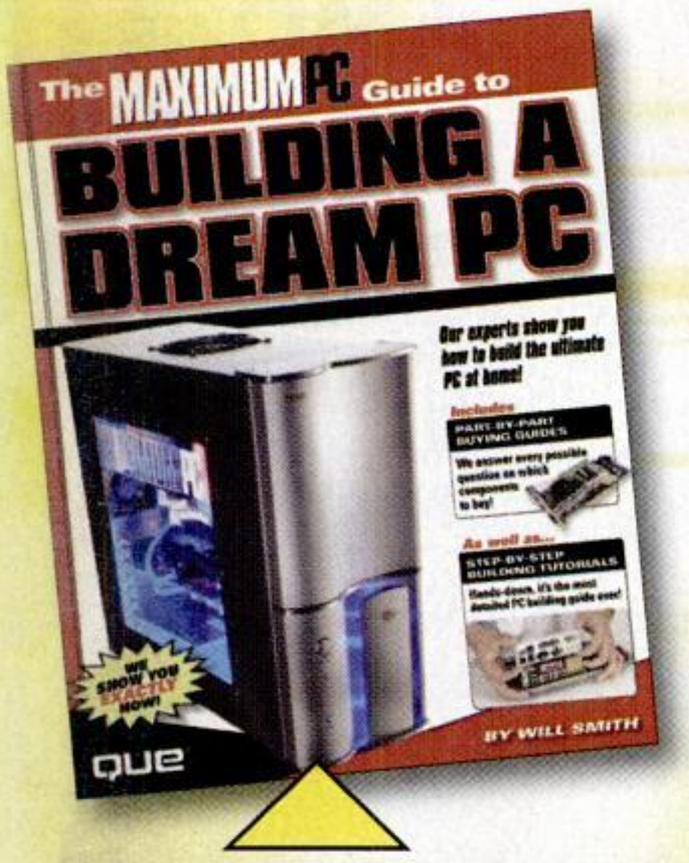
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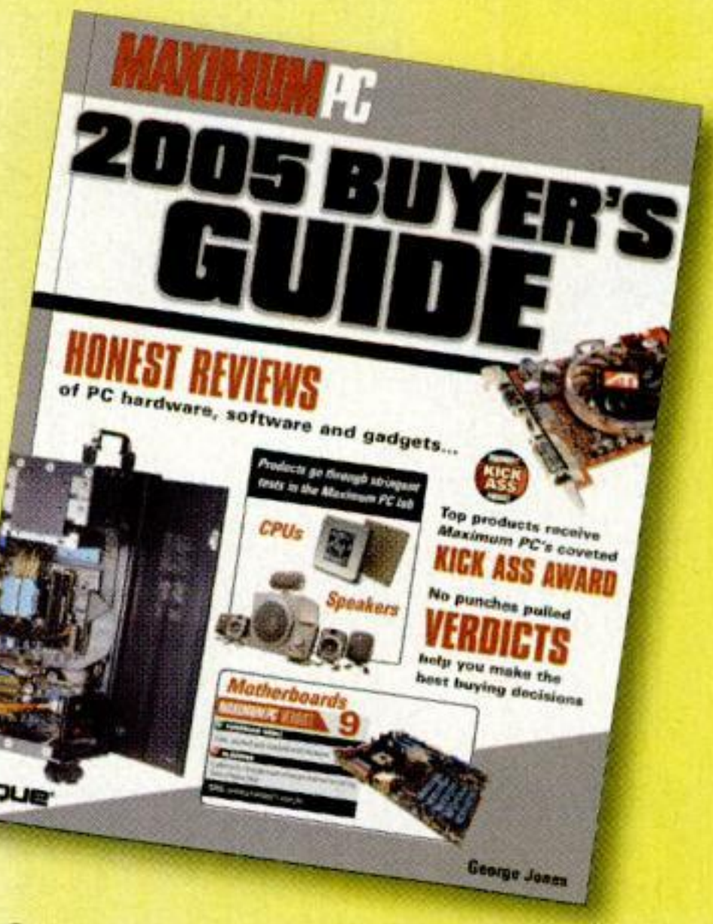

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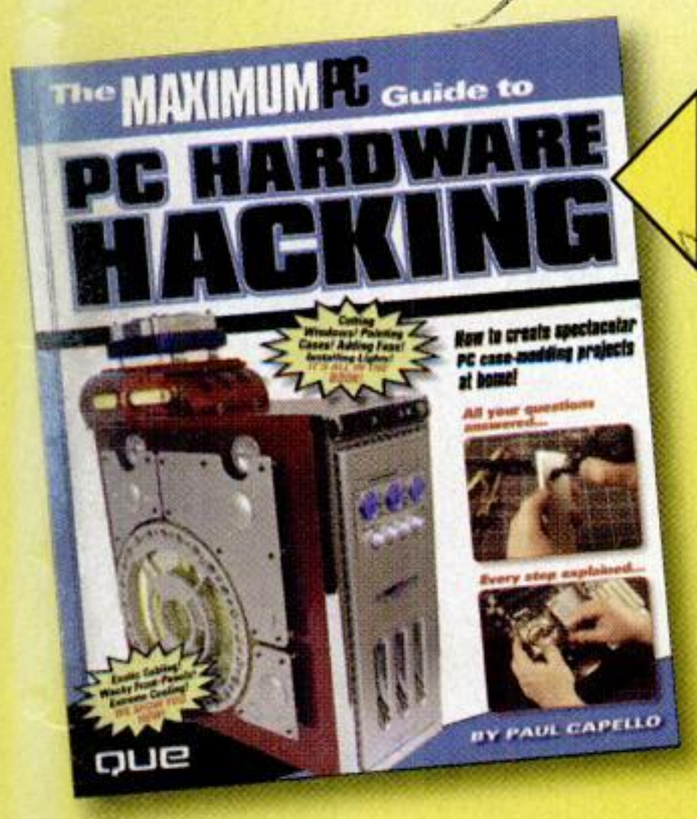
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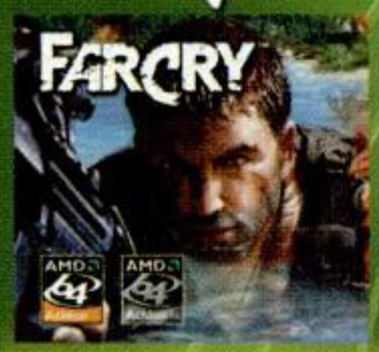

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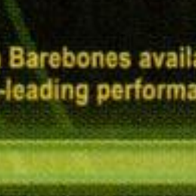

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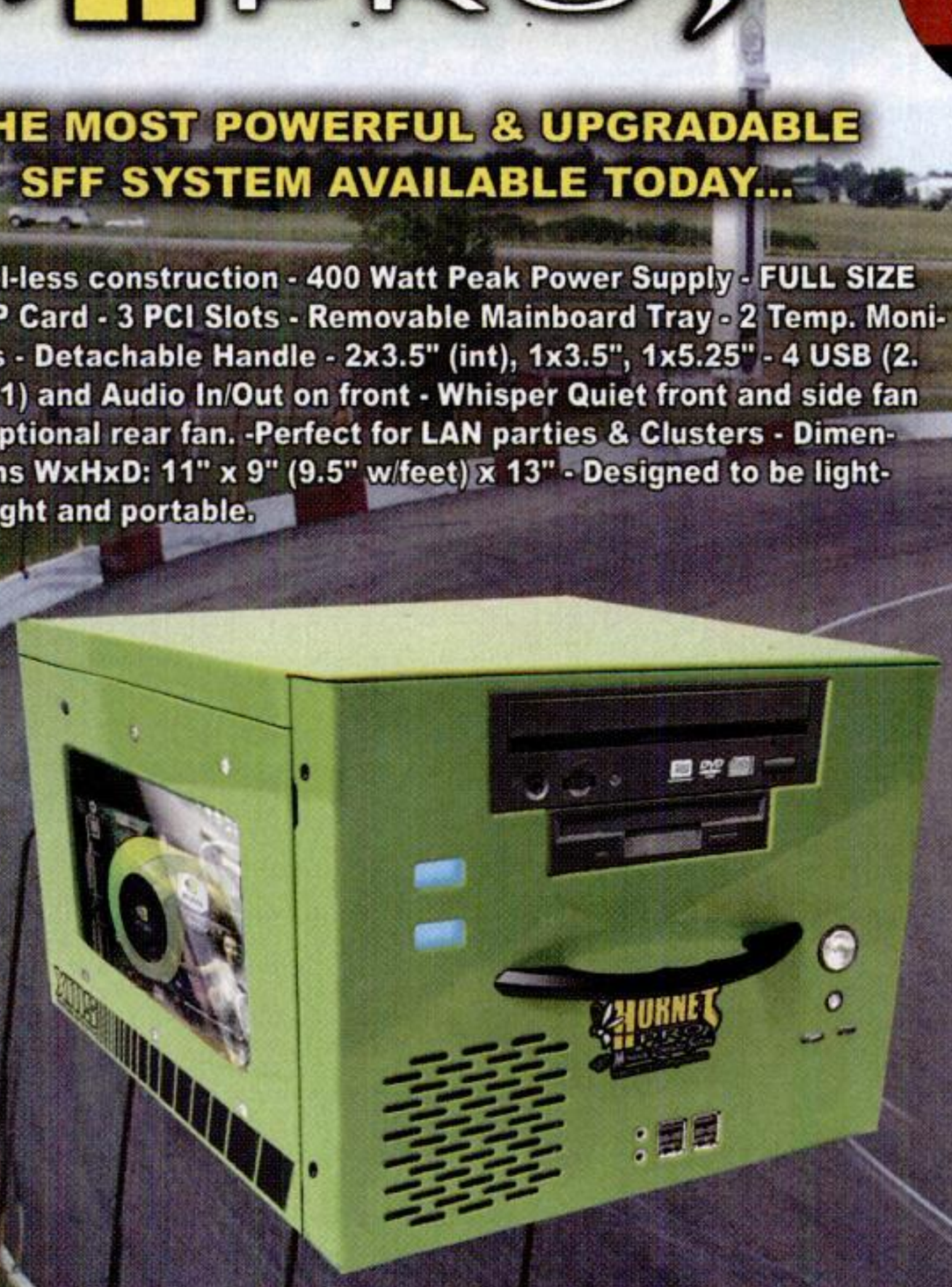

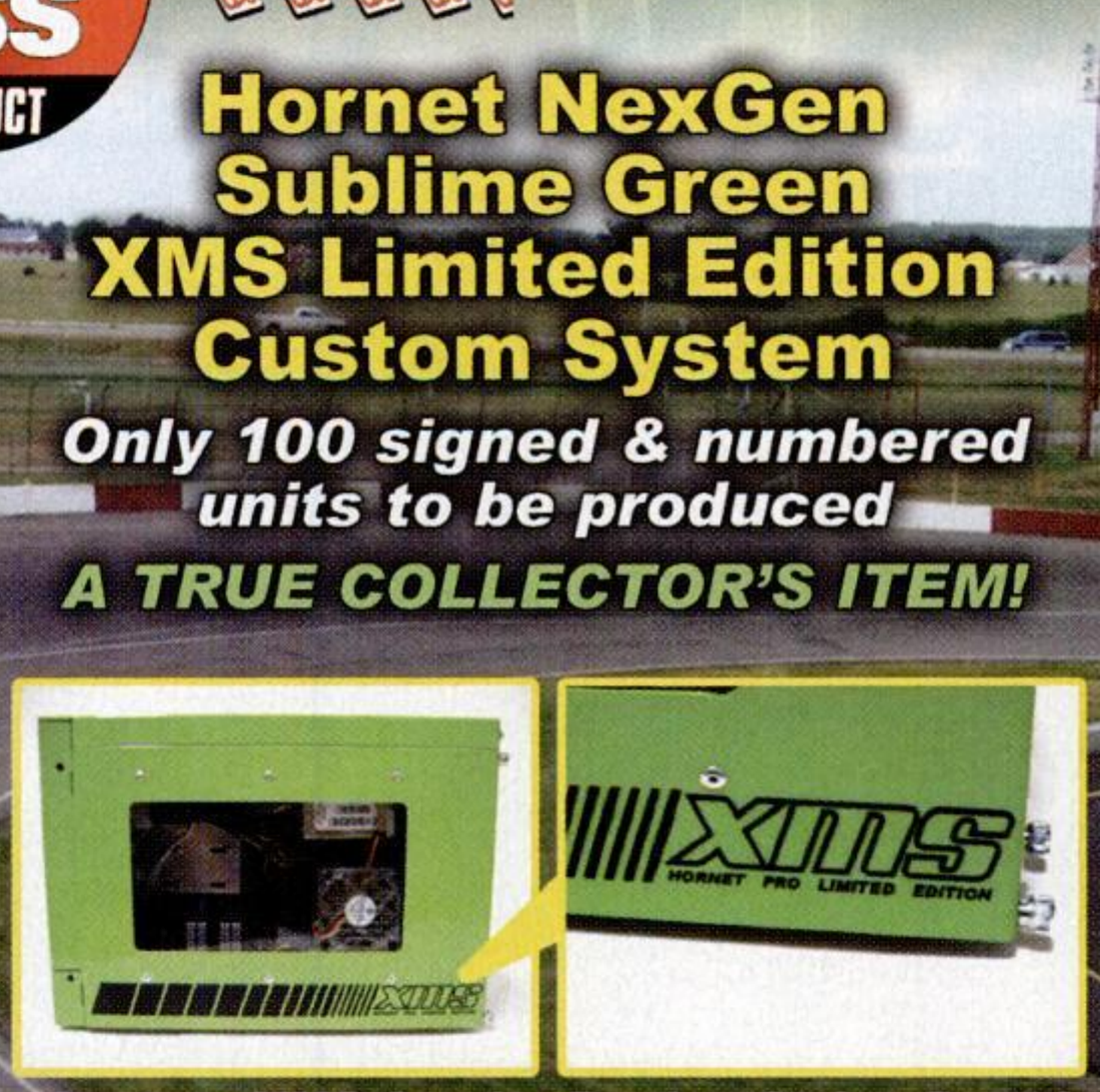

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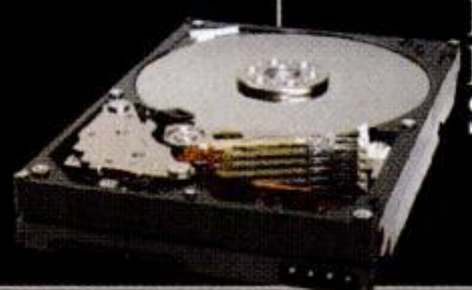

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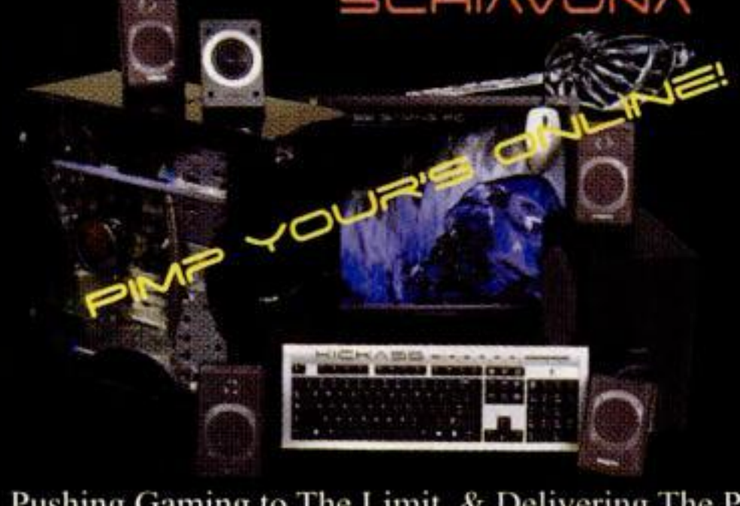

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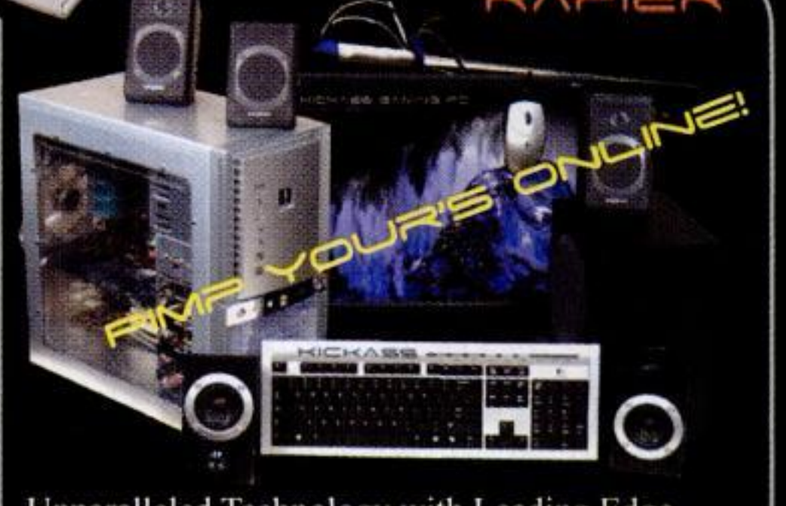

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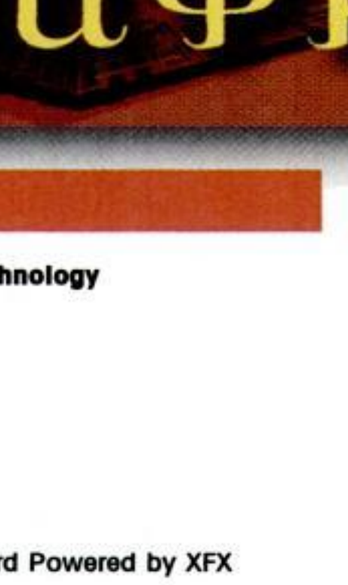

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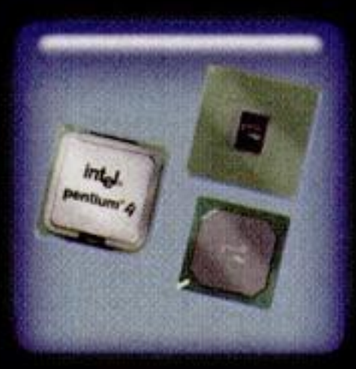

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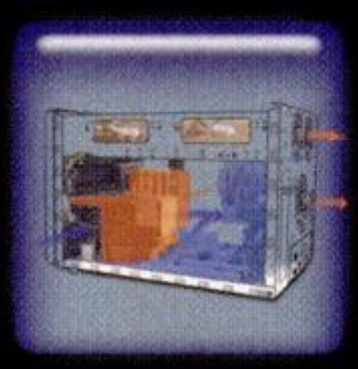

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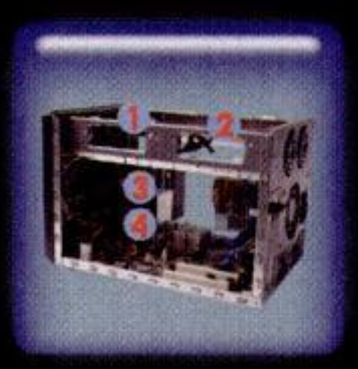

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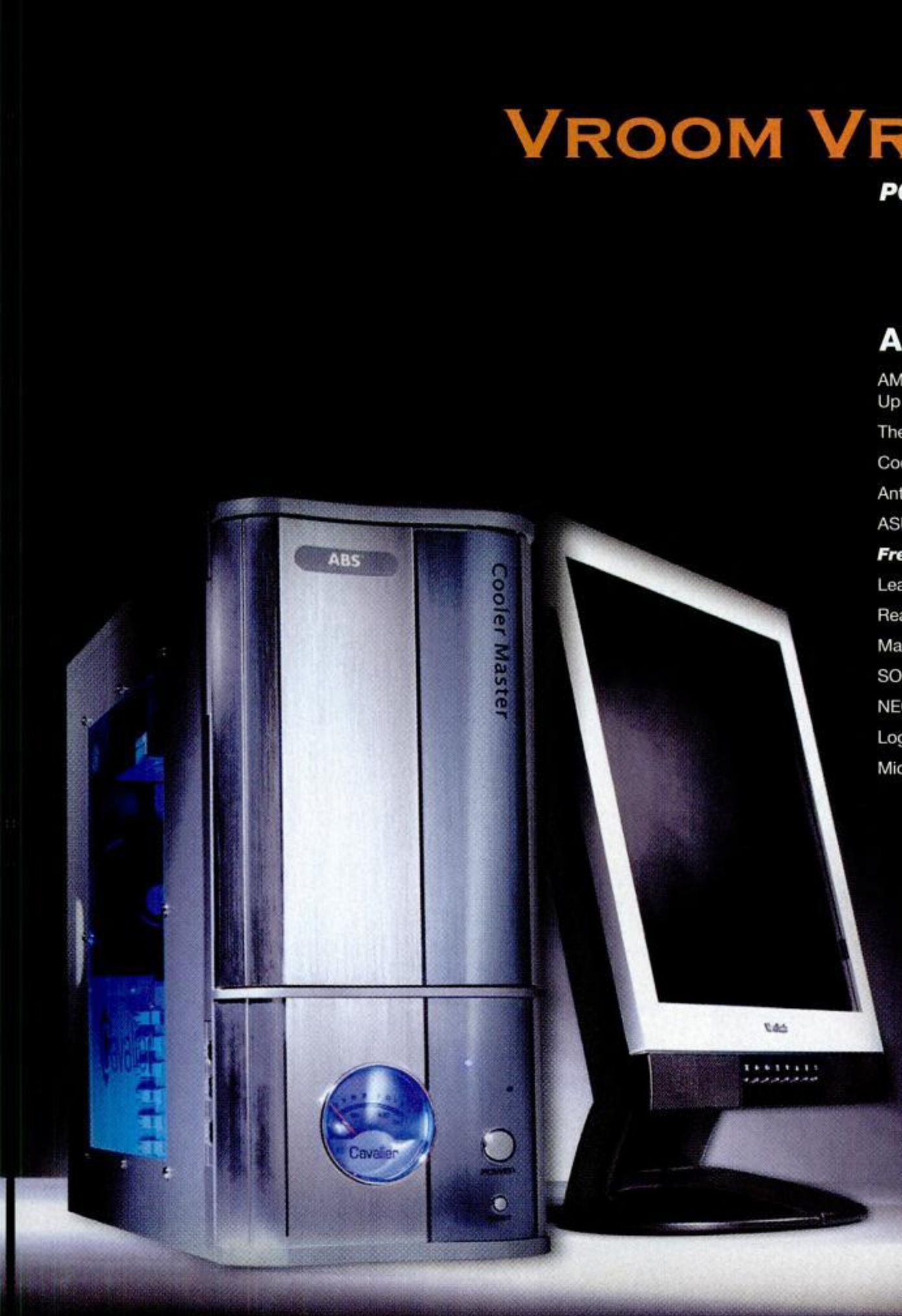

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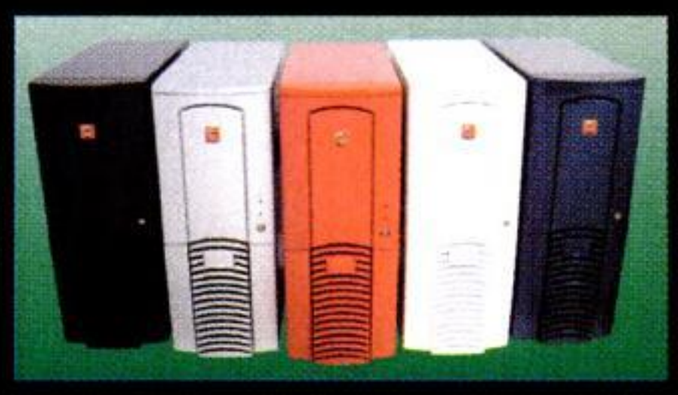

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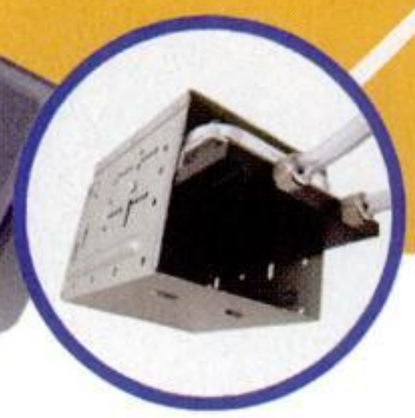

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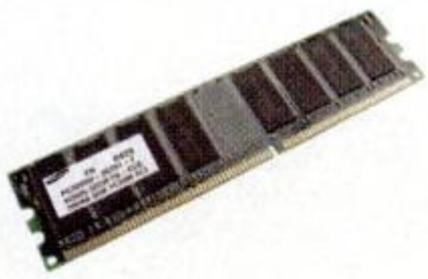

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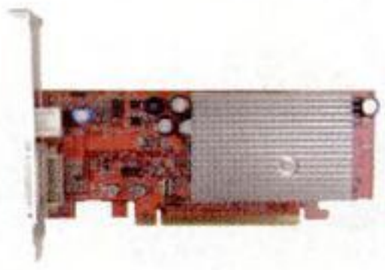

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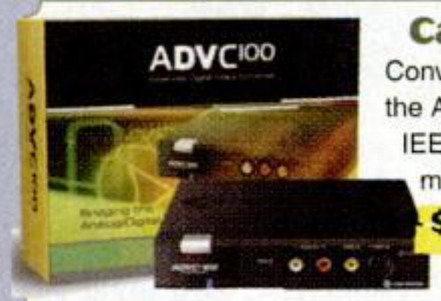

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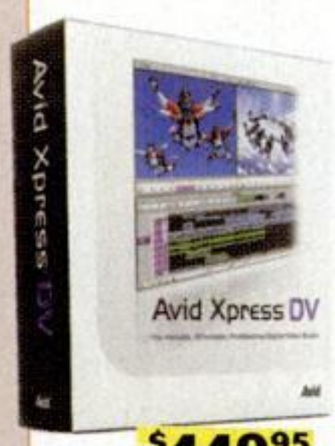

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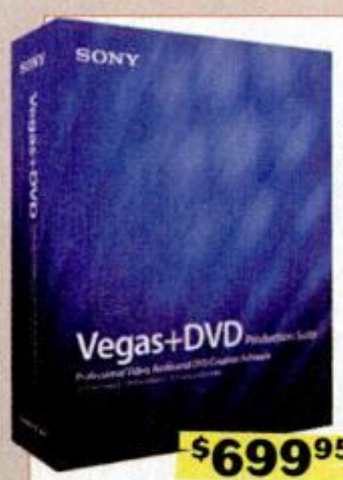

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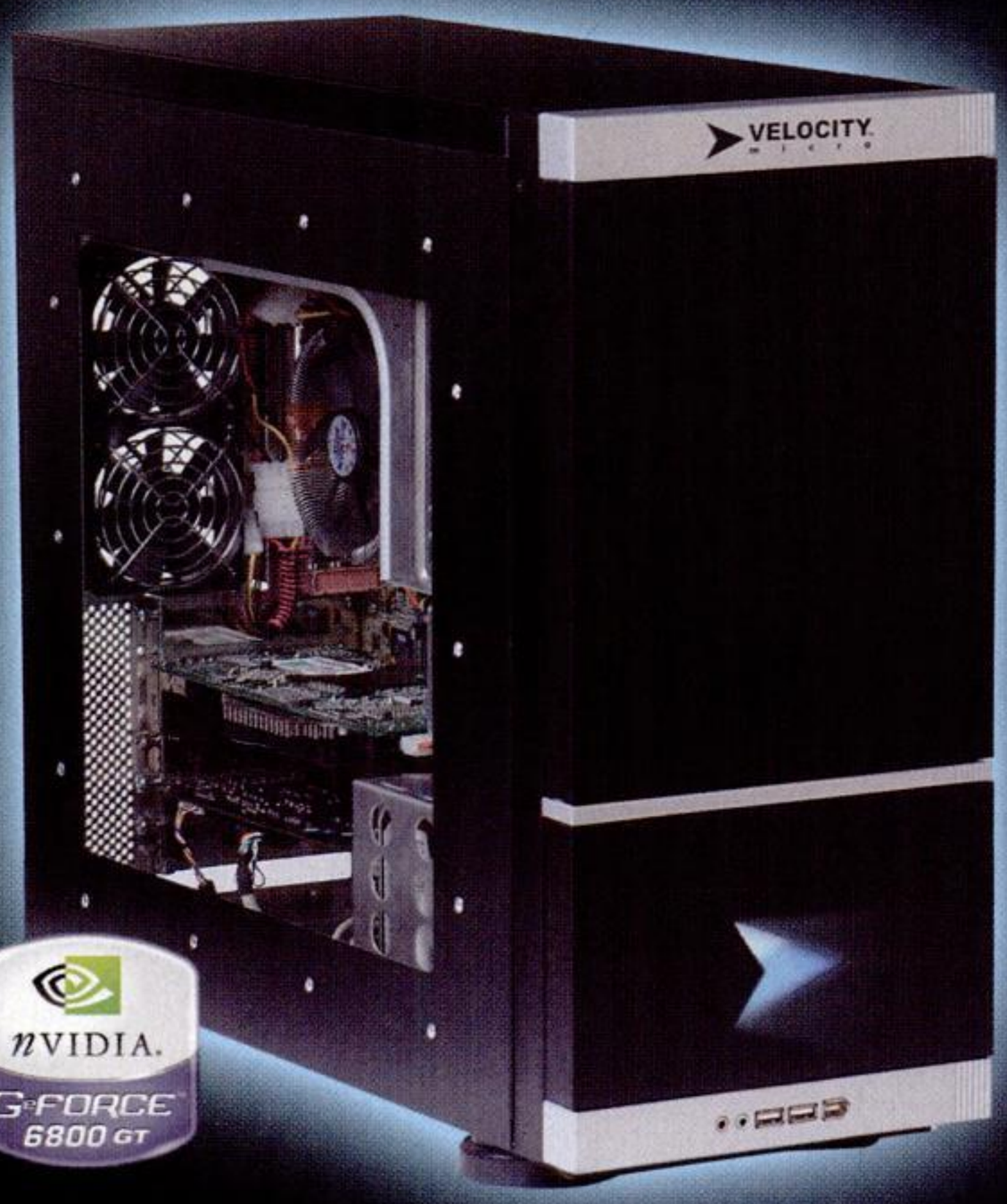

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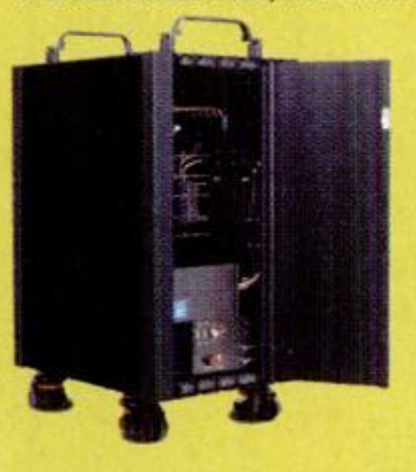

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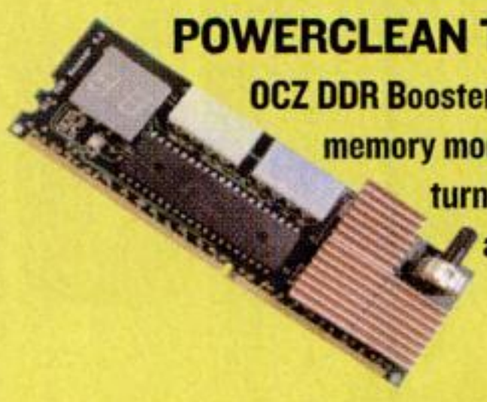

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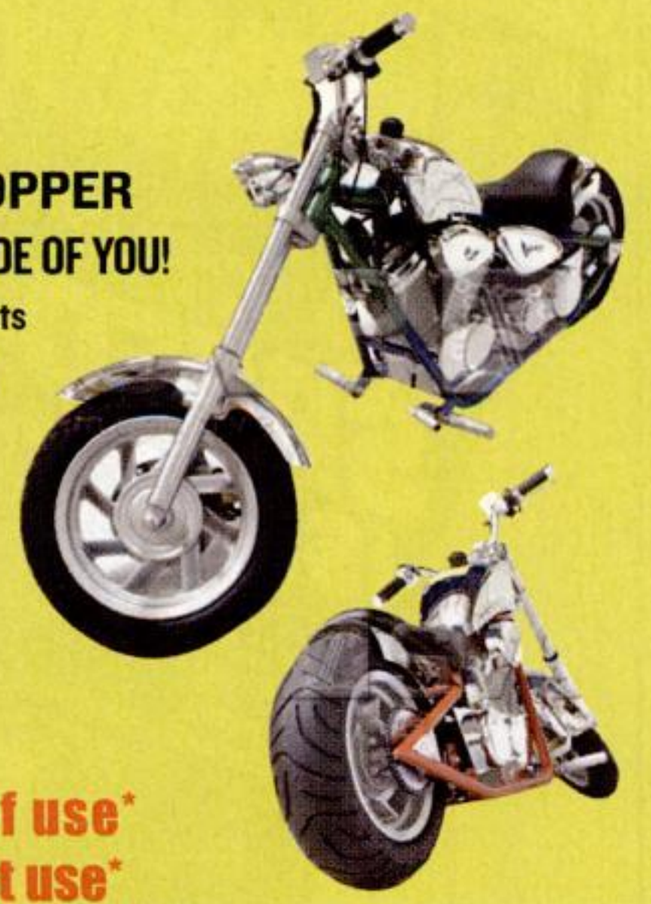

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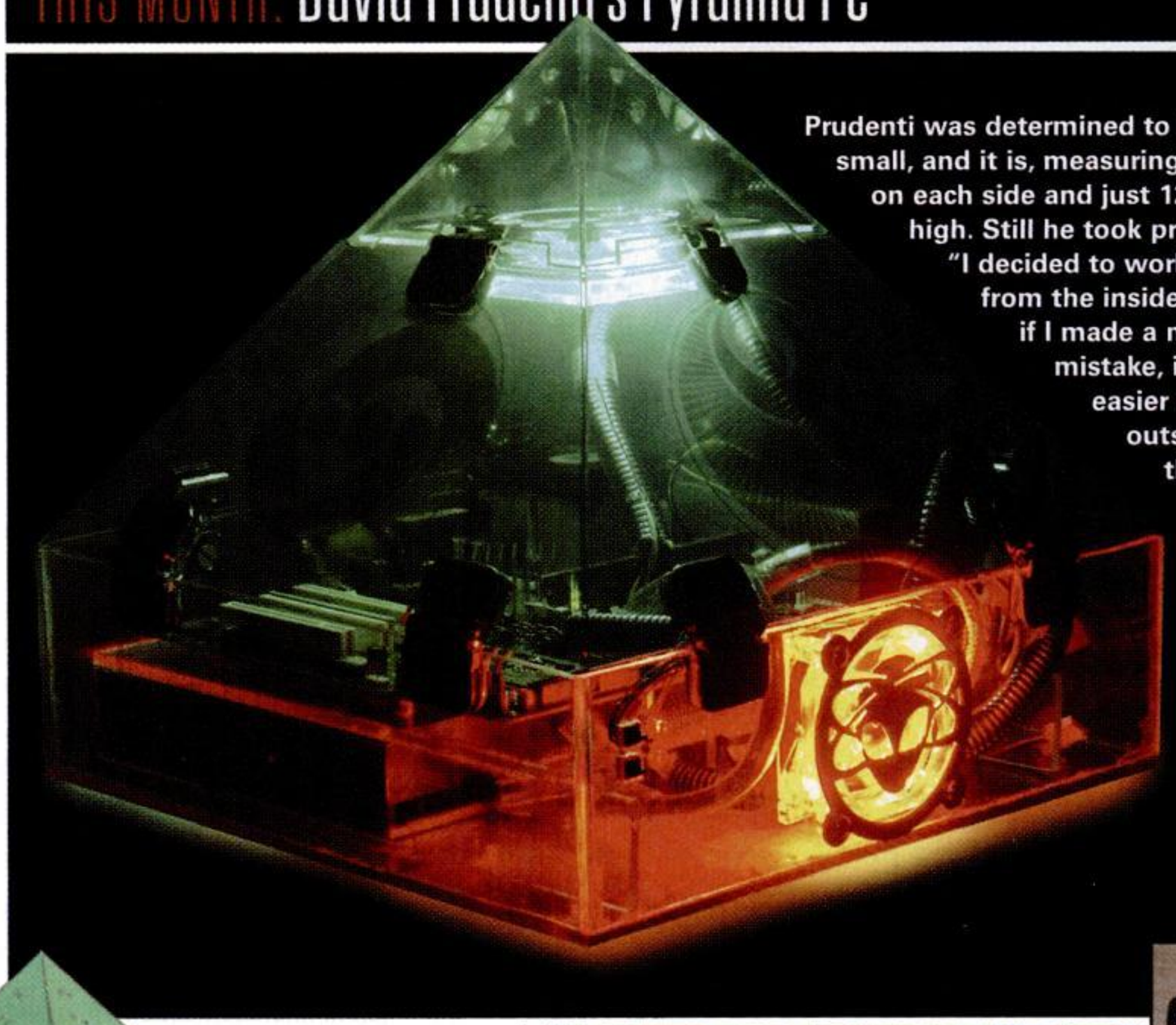
MAXIMUMPC Rig of the Month

THIS MONTH: David Prudenti's Pyramid PC

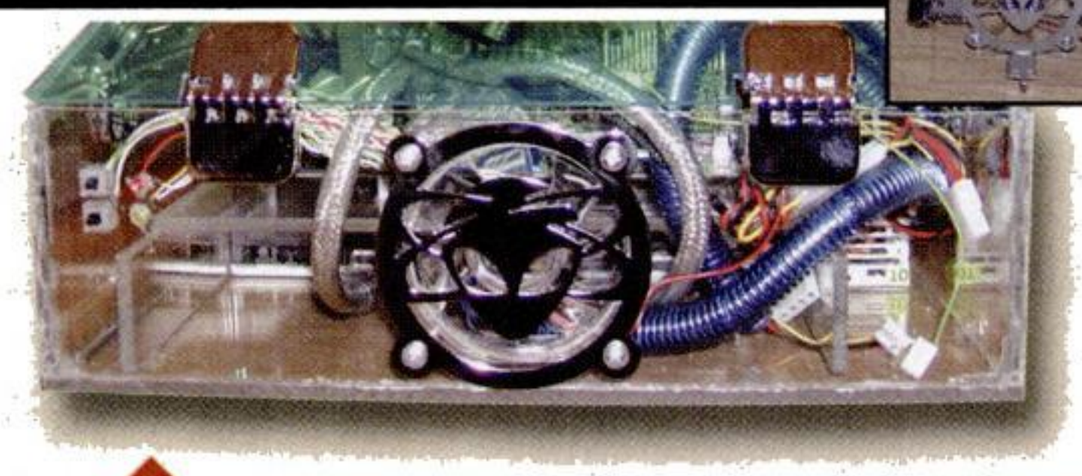
What's the story behind Egypt's pyramids? How were they built? Who built them? Do they represent some mysterious power source? And what does any of this have to do with David Prudenti? The first four questions are up for debate; as for Prudenti, the subject of Egypt's ancient monuments is of great personal interest and one he sought to embody in his first custom-built rig.

Look closely, and you can see why Prudenti calls the PC "an artistic tribute to radical beliefs." The to-scale Plexiglas replica of Giza's Great Pyramid is guarded over by alien-head fan grills, and affixed to each side of the case is a decal bearing the image of an actual crop circle.

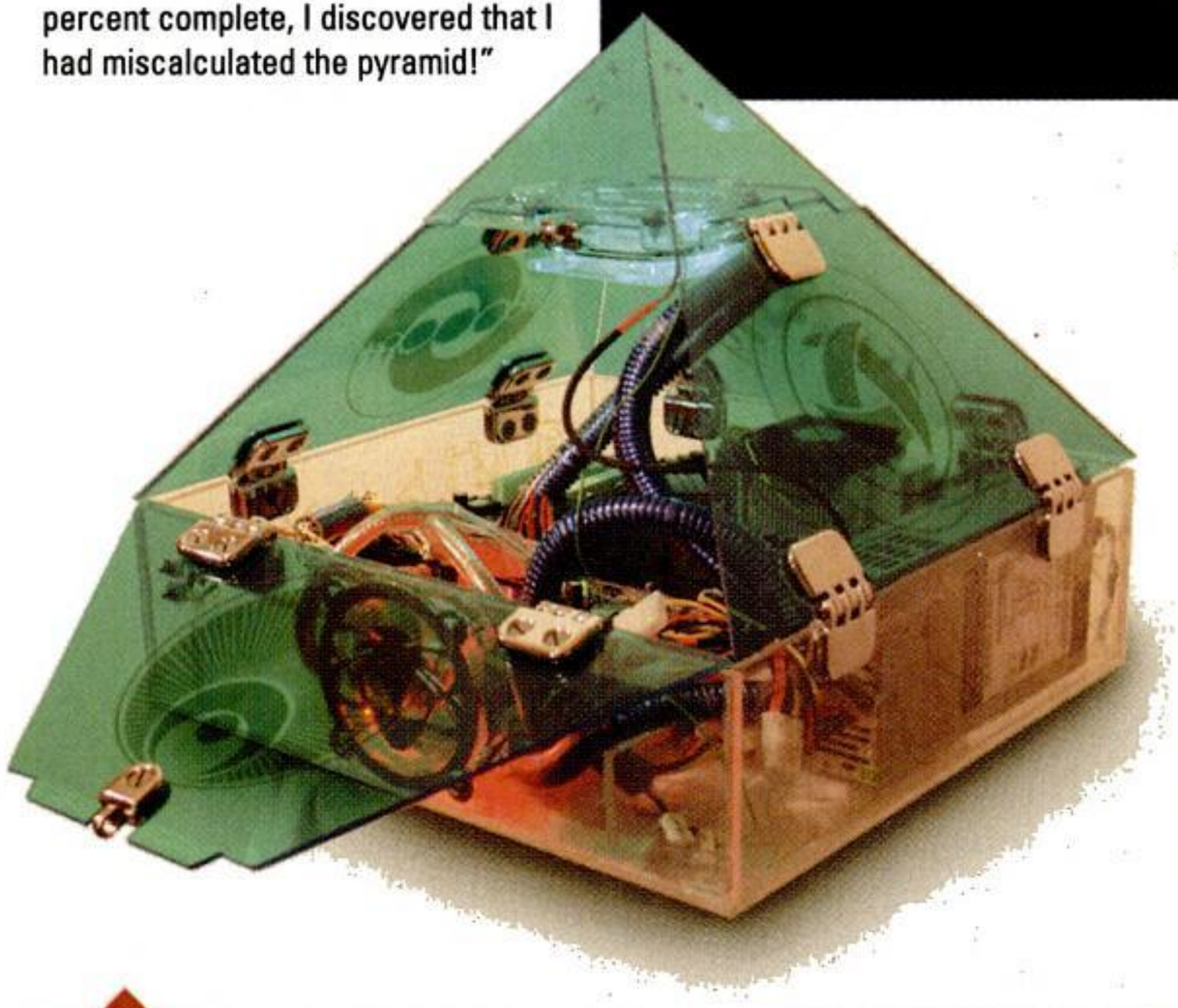
But the Pyramid PC also represents another philosophy: an adherence to careful planning. Prior to constructing the real deal, Prudenti created detailed blueprints in an illustration program, followed by a full-scale prototype made of cardboard. A good thing, too—as he puts it: "When the prototype was about 90 percent complete, I discovered that I had miscalculated the pyramid!"



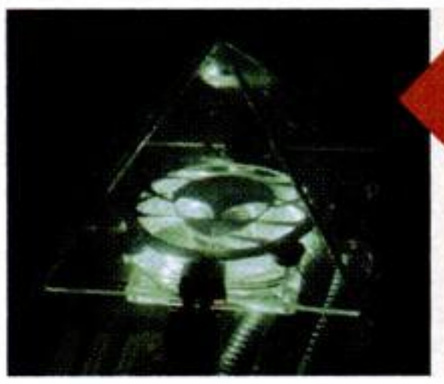
Prudenti was determined to keep the PC small, and it is, measuring 14.1 inches on each side and just 12.9 inches high. Still he took precautions: "I decided to work on the case from the inside out. I figured if I made a measuring mistake, it would be easier to make the outside bigger than the inside smaller."



A Plexiglas base beneath the Pyramid is able to house the majority of the PC's components in a stacked configuration.



Glass hinges and glue hold the many individual pieces of Plexiglas together. Two of the Pyramid's sides open for access to the parts. Internal clutter is managed with metallic-blue wire wraps.



A vented, detachable capstone forms the tip of the Pyramid. It allows an interior fan at the top of the PC to pull hot air up and out of the case.

If you have a contender for Rig of the Month, e-mail **input@maximumpc.com** with high-res digital pics and a 300-word write-up.

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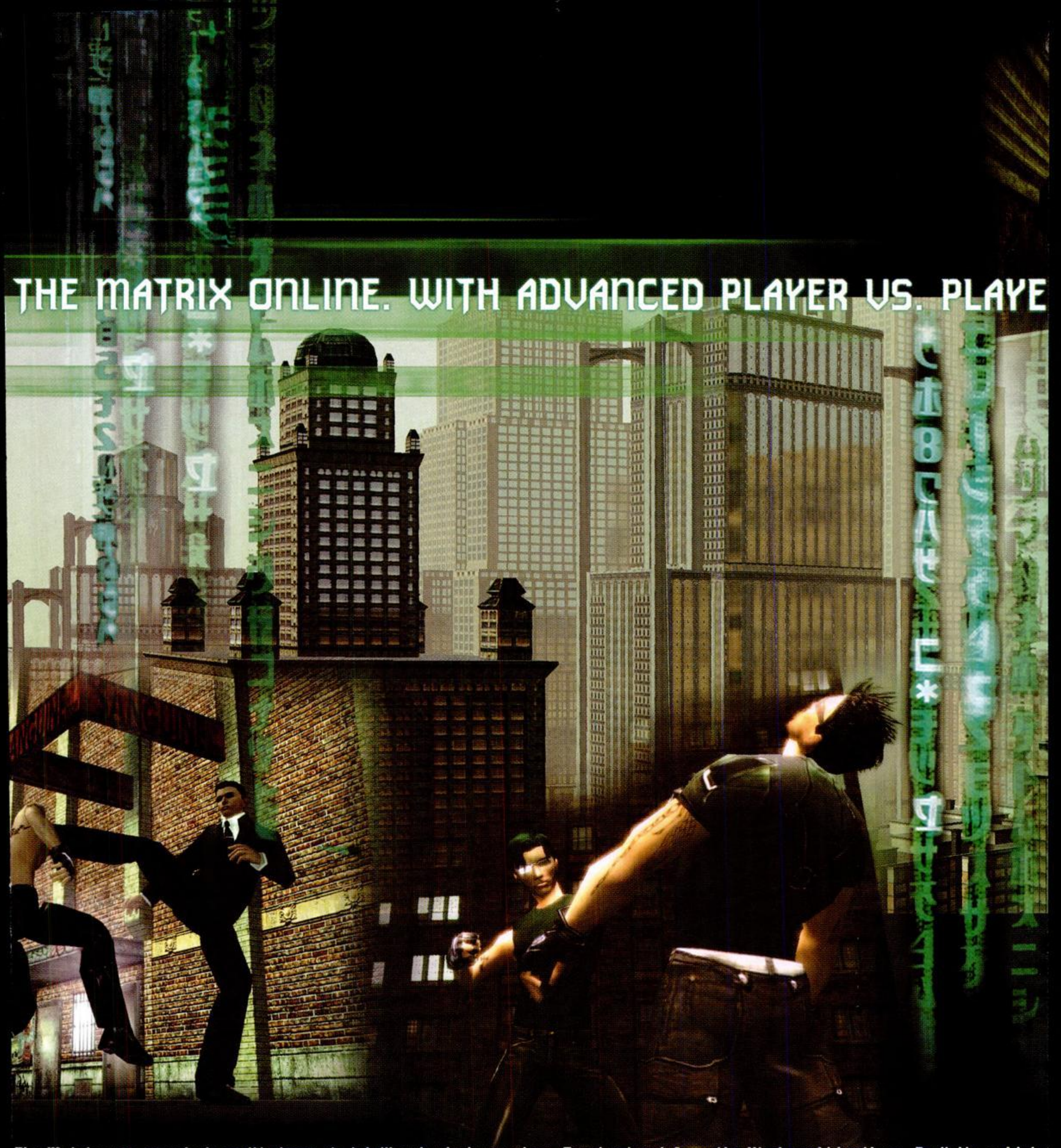

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